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Mary H. Swindler, *Ancient Painting*, New Haven, Yale University Press, 1929, p. 60.

Charles Diehl, *Manuel d'art byzantin*, 2nd ed., Paris, Librairie Auguste Picard, 1925, II, pp. 73–78.

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14. The funds of the ART BULLETIN do not admit of an expenditure of over fifteen per cent (15%) of the cost of composition for alterations in articles once set up in galley proof. In order that contributors may be spared the expense of exceeding this allowance, they are urged to prepare their manuscripts as nearly as possible in conformity with the above rules. In cases of doubt as to form, contributors are referred to *A Manual of Style* published by the University of Chicago Press.

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16. The name of the institution with which an author is connected will be printed at the end of his contribution; brackets will be used to denote that the author is a student at that institution.

THE DOME OF HEAVEN

KARL LEHMANN[1]

"Haec, Auguste, tamen, quae vertice sidera pulsat, par domus est caelo sed minor est domino."

Martial, *Epigr.*, VIII, 36, 11–12.

"Ὁ δὲ οὐρανός μοι θρόνος, ἡ δὲ γῆ ὑποπόδιον τῶν πόδων μου λέγει Κύριος Παντοκράτωρ."

Inscription surrounding the bust of Christ in the dome of the Palatine Chapel, Palermo.

ONE of the fundamental artistic expressions of Christian thought and emotion is the vision of heaven depicted in painting or mosaic on domes, apsidal half-domes, and related vaulted forms. It is the culminating theme of the theological decoration of religious buildings from the beginnings of ecclesiastical art in the age of Constantine the Great throughout the entire development of Byzantine art. It survives in numerous varieties in the Western religious art of mediaeval, Renaissance, and Baroque periods. Michelangelo's ceiling in the Sistine Chapel and many ingenious contemporary and later ceiling decorations transfer this Early Christian and Byzantine scheme into the world of modern speculation and emotion; as Milton likewise achieved the great transposition of mediaeval cosmology into modern thought.[2] Though the idea of interpreting the ceiling as the sky may be the result of a general and not unnatural association and though it also found expression outside the sphere of Western art,[3] the specific forms and the systematic approach of Christian monumental art far transcend such general associations. In all their specialized varieties and applications, the Early Christian patterns of heaven on vaults and ceilings are united by a common systematic, centralized and organized approach, an approach which is cosmic in the triple sense of the Greek meaning of this term: it combines decorative ideals of formal beauty with an order of speculative reasoning and the concept of a permanently established world.

The problem of the origin of these schemes is of the utmost importance in view of their preëminence in Christian monumental art and of their intimate connection with the development of the architectural form of the dome which ultimately became their ideal field of crystallization. In spite of the fact that this is obviously so, no serious effort seems to have been made to clarify the question whether this vision of heaven is a new and unprecedented expression of Christian faith or whether, in its specific forms, it is an offshoot and descendant of pre-Christian pagan types.[4] Inasmuch as the latter is true of almost every other fundamental feature of Christian monumental art, one might a priori assume a similar relationship in this instance. It is the purpose of the following discussion to establish and clarify the antique background of the Christian vision of heaven in the dome and to discuss some problems of the iconography, decorative system, development, and symbolism of domed construction in antique and late antique art.

Let us begin with a superficial formal comparison of two examples of Christian and pagan ceiling decoration widely separated in chronology, function and spirit. The

1. For many suggestions and extensive help, I am indebted to my wife, Phyllis L. Williams. I also wish to express my gratitude for valuable information to Walter Allen, Jr., Herbert Bloch, Phyllis Bober, Ilse Falk, Ernst Herzfeld, Nancy S. Holsten, Richard Krautheimer, Doro Levi, Charles R. Morey, Richard Offner, Elizabeth Riefstahl, Guido Schoenberger, and Bluma Trell.

2. For Italian Renaissance and Baroque ceilings, see A. Colasanti, *Volte e soffitti italiani*, Milan, 1915.

3. For Egyptian ceiling decoration, which generally prefers all-over textile motifs, see G. Jequier, *Décoration égyptienne*, Paris, n.d.; but often, in naturalistic illusion, it interprets the ceiling as a starry heaven: *Idem*, *Manuel d'archéologie égyptienne*, Paris, 1924, p. 292; cf. G. Maspero, *L'archéologie égyptienne*, 2nd ed., Paris, n.d., p. 88. The Egyptian symbolism of heaven (H. Schaefer, *Aegyptische und heutige Kunst*, Berlin, 1928, pp. 93 f.) represented as a woman bending over the world is entirely different from the later Western tradition. On the other hand, systematic representations of astronomical heavens occur in Egypt only in the Roman period. See below, p. 5.

4. See, for example, G. Wilpert's chapter "Behandlung des Firmaments in der römischen Kunst," in *Mosaiken und Malereien*, Freiburg, 1917, I, pp. 53 f., dealing exclusively with Christian materials. In the modern discussion of individual monuments or of more comprehensive character, some of which are quoted below, nearly all the antique works of art and literary sources discussed here have been neglected. The idea of a lack of continuity between antique and Christian decoration is typically expressed by E. Müntz, *Revue des deux mondes*, July, 1882, pp. 162 f. On the other hand, some useful general observations on the lines of this study have been made by C. Cecchelli, *Architettura ed arti decorative*, II, 1922, pp. 3 f. A few, somewhat confused observations about corner figures are found in W. de Grueneisen, *Les caractéristiques de l'art copte*, Florence, 1922, pp. 71 f.; also C. Ricci, *Monumenti*, V, p. 45. Most writers on Early Christian and Byzantine art ignore the issue completely.

eastern dome of San Marco in Venice,[5] an outstanding work of late Byzantine art based on a long and unbroken tradition handed down from Early Christian times, may serve as a starting point (Fig. 1). In the center, a bust of the Savior emerges from the starry sphere of heaven which is framed by an iris border. Around it and above the windows, on the symbolically celestial golden ground, appear the saintly figures of the Virgin and prophets. Floral motifs fill the spaces between the windows, whose frames and arches are decorated with additional floral and starry ornaments. In the four pendentives the symbols of the Evangelists with outstretched wings emerge from the clouds of the lower atmosphere; the clouds rest upon floral forms which fill the lower corners. As the Latin inscription explains, the Evangelists are entrusted with conveying the meaning of otherwise obscure divine truth to the mortal world below: they support by written tradition the truth which was forecast by the prophets represented above, and which manifests itself in the summit with the presence of the Cosmokrator in the celestial orb.[6]

At first sight a comparison of this great and elaborate theological picture with an Italian ceiling which is 1700 years older will undoubtedly seem fantastic and far-fetched to the reader. We may nevertheless ask his indulgence, so that it may serve as a point of departure. A single square coffer in the center of a flat, rock-hewn ceiling in the rear chamber of an archaic Etruscan tomb, the Tomb of the Monkey in Chiusi (early fifth century B.C.), shows an unusual painted decoration (Fig. 2): in each of the four corners a diagonally placed Siren supports the rounded central motif.[7] This is a disk painted red[8] and decorated with a green foliate pattern. It is framed by a double border, of which the outer edge is scalloped. At first the analogy between the two monuments seems to be purely formal and restricted to the combination of a central dominating circle and diagonal winged corner supports. Even so, we may face here the beginning and end of the formal development of a pattern. But this formal analogy becomes more substantial if one investigates the meaning of the motif in the Etruscan tomb painting. In this connection, the editor of the fresco mentioned the funereal significance of the Sirens, as the soul-birds of Greek and Etruscan art. But that relationship is not sufficient to explain their subordinate rôle as supports of a great round central motif. The carpet-like motif with its fringed border is a kind of baldachin which the Sirens carry. It is a canopy, rendered in the plane projection of archaic art. In view of our preliminary comparison, we may suggest that it is the canopy of heaven.[9] Such a suggestion, however, would remain hazardous unless we could prove three facts: first, that in early Etruscan art the Sirens were connected with the celestial sphere; second, that Sirens and related winged figures continued to be used in a similar diagonal position as the supports of a central celestial representation on ceilings; third, that the canopy as a symbol of heaven was also a common central element in the decoration of ancient ceilings.

In reality, all three of these facts can be illustrated by extant monuments. A few of them may be presented in this initial stage of our investigation in order to clarify the direction to be followed later. As to the celestial affiliation of the Sirens, we possess an extremely interesting Etruscan artifact which is considerably earlier than our fresco, a heavily decorated gold bracelet from Tarquinia (Fig. 4).[10] Its astrological and apotropaic character is obvious. At one end we see the sun-disk with a rayed star in the center and beneath it a crescent moon. Its center is supported by two laterally seated bearded male demons. Nearer the center of the bracelet the crescent moon appears again several times, and its curve is each time filled with a Siren of exactly the same type as we have seen on the painted ceiling. Within the context of Etruscan astrological speculation which was derived from Mesopotamia, it is not surprising to find demons of Eastern origin associated with the heavenly bodies. We need not pursue this line further. It suffices to state that the Sirens were known in archaic Etruria as heavenly demons of astrological character. Whence and how this idea was included in the realm of funereal speculations[11] is not our concern. But it may be noted that not

5. For the mosaics of San Marco, see O. Demus, *Die Mosaiken von S. Marco, 1100–1300*, Vienna, 1935. The central medallion, though not preserved in its original state, is a restoration of the 13th century (pp. 23, 86, note 21).

6. For similar ideas in Carolingian art, see W. Weisbach, *Gaz. d. B. A.*, LXXXI, 1939, pp. 137 f.

7. R. Bianchi-Bandinelli, in *Monumenti della pittura antica*, ser. I, *Clusium*, fasc. I, Rome, 1937, pp. 6 f., fig. 8.

8. The red color may well be symbolical of light. E. Wunderlich, *Die Bedeutung der roten Farbe*, Giessen, 1925, pp. 96 f. In the first cupola of the narthex of San Marco, in the scene of the separation of light from darkness, the globe of light is still intensely red, and that of darkness is blue-green: A. Gayet, *L'art byzantin*, I, Paris, 1901, pl. 22. In Byzantine art the stars sometimes express the source of emanating light, a red center: *ibid.*, II, pl. 19. In the well known *Prayer of Isaiah* in the Paris Psalter the scarf of Night is blue with white stars, and the heavenly sphere from which God's hand issues is light red: H. Omont, *Miniatures des plus anciens manuscrits grecs*, Paris, 1929, pl. 12 bis. See also below, p. 11, note 77.

9. For this motif, see the learned work of R. Eisler, *Weltenmantel und Himmelszelt*, Munich, 1910, 2 vols. (which, however, is bewilderingly lacking in knowledge of the monuments and sources discussed here: see particularly the false generalizations, II, p. 613), and below, pp. 9 f.

10. *Monumenti dell'Ist.*, 1854, pl. 32, no. 2, fig. 1; G. Karo, *Le oreficerie di Vetulonia* (*Studi e materiali di archeologia*, vol. 2), 1902, p. 68, fig. 74; H. Mühlestein, *Die Kunst der Etrusker*, Berlin, 1925, pp. 197 f., with bibl. (without recognizing the Sirens as such), figs. 88 f. For astrological bracelets, see H. Gressmann, *Die hellenistische Gestirnsreligion*, Leipzig, 1925, p. 21.

11. A Siren leads the chariot of apotheosis to the other world on an Etruscan ring: Roscher, *Ausf. Lexic. der griech. u. röm. Mythologie*, 1909–15, IV, p. 613, fig. 5 on p. 611.

only the type of sun-disk on the bracelet, but also the demons supporting it and the figure in the moon are of oriental origin: the leaf pattern with a center of concave arches which decorates the central circle on the ceiling was also derived from Near Eastern tradition. Together with definite star forms, it occurs in Assyrian art in the embroidered decoration of the garment of the heavenly god Marduk.[12]

Our second requirement was to prove the persistence of Sirens or similar winged figures as diagonal corner supports in representations of the sphere of heaven. Here we are able to point to a lucid discussion of the ceiling decoration of the southern adytum of Bel in his temple in Palmyra (Fig. 3).[13] This decoration can be dated about the beginning of our era. Thus it stands halfway between our Etruscan painting and the great age of Early Christian art. It shows a central square field filled by a circle. The circular center is hollowed out from the monolith to form a flat dome. This dome is filled with a carpet-like geometrical pattern of relief fields which show the busts of the seven planets; the central one, Bel-Jupiter, dominates the composition as does the bust of the Pantokrator in Venice, with subordinate heavenly figures radiating from him. The ruling heavenly bodies in the dome are framed by the circle of the zodiac on the outer fringe of heaven. Finally, the four corners of the heavenly circle are supported by diagonally placed Sirens. L. Curtius, who thought this element was unique, pointed out its relationship to Plato's vision of the music of the heavenly spheres produced by the Sirens (Pol. x, 114, 2; 616 A f.) and to a Pythagorean background.[14] It is evident that the originally Eastern idea of the Sirens as heavenly demons influenced the representations of the ceilings in Chiusi and Palmyra before and after Plato, as it also inspired Plato's own vision. But it is also significant that many centuries later, in the same church of San Marco, where we saw a cupola with supporting symbols of the Evangelists, their images appear in another mosaic (over the entrance door), accompanied by an inscription which attests their succession to the Platonic musicians of the spheres: "*Ecclesiae Christi | vigiles sunt quattuor isti, | quorum dulce melos | sonat et movet unique caelos.*"[15]

We may now move another step forward and glance at a lost ceiling decoration (probably in stucco) from the Villa of Hadrian (Fig. 5).[16] Chronologically it stands halfway between the ceiling of Palmyra and the age of Constantine. In the center of the vault, the globe of the firmament with the stars and the belt of the zodiac may be taken as the forerunner of the heavenly sphere in the center of the cupola of San Marco and numerous earlier Byzantine examples. This sphere has a strange curved fringe, which reminds us of the outer edge of the canopy of heaven in the fresco from Chiusi. It is supported by four dancing children, who circle in rhythmical musical movements.[17] This theme occupies the center of what is clearly a tent-like *velum* or canopy, with concave edges between eight projecting corners. The surface of this carpet is, so to speak, embroidered with an inner square from the corners of which another carpet-like form with four concave sides emerges. Every space of this carpet is filled with scrolls and figures which we may leave aside for the moment. What matters to us at this point is the fact that the four corners of the big central carpet are diagonally supported by "grottesque" structures; they arise from acanthus motifs filling the lower corners, like those of the pendentives of San Marco. These supporting tabernacles are flanked by two herms of Pan, the great god of nature. Between these herms "Giants" terminating in snakes, or earthbound creatures, support a central floral "candelabrum" beneath a floral arch. From this arch the four actual corner supports of the central canopy emerge. They are four winged female demons, and if they are not actually our Sirens, they are at least closely related to them in form and meaning. Undoubtedly, these demons are successors of the Sirens supporting the corners of the carpet or the dome of heaven which we saw in the ceilings of Chiusi and Palmyra. Leaving other elements aside for the time being, we may call attention to the fact that other radial figures of the celestial world appear between floral decorations near the outer fringe of the ceiling, like the saintly figures of the cupola of San Marco. They are a chorus of eight dancing maidens, most likely Horae (of the Hours). Alternating with them we see four divine figures: Jupiter, Mars, Venus and (probably) Leda-Luna[18] the four planets who command time and destiny and whose images we met in busts around the timeless and eternal Bel-Jupiter in the Palmyra ceiling.

12. See the well-known Marduk seal (9th cent. B.C.): R. Eisler, *op. cit.*, p. 60, fig. 6; E. Unger, *Babylon*, Berlin, 1930, p. 210. Can this use of floral motifs possibly be connected with the idea of the astral trees on top of the cosmic mountain? See O. Jeremias, in Roscher, *op. cit.*, IV, pp. 1492 f.; Ps. Calisthenes, *Alexander*, ch. 3.

13. L. Curtius, *Röm. Mitt.*, L, 1935, pp. 348 f., with bibl. For the ceiling of the southern adytum which also has a flat cupola in the center (not indicated by Dr. Schulze in Th. Wiegand, *Palmyra*, Berlin, 1932, pl. 83), see K. A. Cresswell, *Early Muslim Architecture*, Oxford, I, 1932, pp. 138 f., fig. 87. The meander instead of the zodiac frame of this cupola points to another decoration. But from Cresswell's photograph it would seem likely to be a kind of canopy (see also Schulze, *op. cit.*, pl. 71).

14. *Op. cit.*, pp. 352 f. Bianchi-Bandinelli (*op. cit.*) was certainly right in rejecting any direct connection between the Etruscan use and the Platonic idea which would revive the ghost of "orphism." But such a motif cannot be purely decorative.

15. Gayet, *op. cit.*, I, p. 21.

16. N. Ponce, *Arabesques antiques des bains de Livia et de la Villa Adrienne*, Paris, 1789, pl. 5. See below, pp. 6 f., note 38.

17. They are probably stars: compare Fig. 8, and below, p. 18, note 153.

18. See below, p. 17, note 39.

These general comparisons between monuments of four such different periods as the early Etruscan, the early Imperial, the middle Imperial, and the Byzantine, may justify our attempt to clarify the pagan background of the Christian vision of the Dome of Heaven.

I

The image of heaven which we discuss here is comprehensive in character; it exceeds ornamental allusion to the sky. It is therefore unnecessary to discuss the possible truth of old theories that all ceiling decorations are ultimately based on such allusions, or to assemble the evidence for starry decorations of Greek coffered ceilings and their later descendants, or to appreciate the degree to which these ornaments, from the Mycenaean cupola tombs on, reveal an awareness of their ultimate implication. Our concern is with the origin and development of a symbolism of heaven on the ceiling, which is expanded to an actual cosmological image, whether it be rationally descriptive, emotionally visionary, or both. Such a vision may occupy part of a ceiling or its entirety. It may be coherent and "exact" or it may be loosely dispersed within a decorative system. It may be confined to one or more elements which are emphasized; or it may aim at "completeness." It can and does select figures of divinities and demons which rule the world, or symbols of heavenly bodies, or a mixture of both. It may use illusionistic images or it may appeal to the reasonable process of "reading" the meaning of abstract symbols; or it may combine both these approaches. In any case, the Christian vision of heaven on the ceiling is based on the practice of decorating ceilings with figured painting, or later, in stucco, stone relief, or mosaic.

Evidence for this practice is entirely lacking in Greece in the earlier periods. The prevailing use of the structural coffered ceiling in monumental Greek architecture was not favorable to it. On the other hand, there is a valuable piece of information in Pliny's account of the history of painting. He says that Pausias was the first to paint flat ceilings and that before his time it was not customary to have painted decorative vaults (xxxv, 124).[19] This information, pointing as it does to a coherent tradition of Greek painted ceiling decoration from the beginning of the Hellenistic age, corresponds to what we know of the monuments. The earliest example of a painted figure on a Greek ceiling is found in a tomb in Southern Russia about the end of the fourth century B.C.[20] It shows a bust of Demeter or Kore in a coffer against a background of blue sky, as if it were an opening in the roof. The position in the center of the ceiling, the use of a bust and of the sky motif, all reveal the origin of many later antique pagan and Christian visions in Greek art of the time of Alexander the Great (Fig. 6). On the other hand, the previously discussed ceiling of the Tomb of the Monkey in Chiusi (Fig. 2) shows that such a practice was already known in Etruria one hundred and fifty years before the initial Greek attempts to use the ceiling for this purpose. The fact that the decoration of coffers with divine heads also occurs in later Etruscan relief ceilings[21] suggests that the relatively late Greek usage may have been derived from Etruria via Southern Italy. But at the present stage of our knowledge any such explanation is hazardous. We also do not know how often figured ceiling decoration was used during the Hellenistic age either in the Greek East or in the Italo-Greek West. For the time being, the evidence from tombs[22] in both regions is not sufficient; evidence from houses and monumental buildings is entirely lacking. It is also impossible to decide whether either of the two schemes of the pre-Roman period is the result of earlier Eastern prototypes. But the representation of a bust[23] and the more comprehensive appearance of the round heavens (Figs. 6, 2) are two basic forms, developed separately in the pre-Imperial world.

We have already observed a synthesis of these two forms in the early Imperial ceiling from Palmyra (Fig. 3). Here, the round canopy of heaven supported by corner Sirens has been filled with busts which are inserted in the coffers. These divine busts represent the planets, and in their entirety they indicate one great sphere of heaven with a Pantokrator-leader in the center. This very expansion of the bust motif not only creates a new and durable type, but it has an astrological, "scientific" nature. The astro-

19. K. Jex-Blake and E. Seller, *The Elder Pliny's Chapters on the History of Art*, London, 1896, pp. 150 f.; E. Pfuhl, *Malerei und Zeichnung der Griechen*, Munich, 1923, II, pp. 731 f.; K. v. Lorentz, in Thieme-Becker, *Künstlerlexicon*, *s.v.* Pausias; A. Reinach, *Recueil Millet*, Paris, 1921, pp. 256 f. and pp. 30 f., note 9.

20. M. Rostovtzeff, *Ancient Decorative Wall Paintings in Southern Russia* (Russian), St. Petersburg, 1914, pls. 7 (fig. 2), 8. I see no reason whatsoever to relate Aristoph., *Wasps*, 1215 and Diphilos, *Comic. Graec. fragm.*, ed. Meinecke, p. 1082, note 2, 1–2, to a figured decoration on a ceiling.

21. Rostovtzeff, *op. cit.*, pl. 9, figs. 5–6.

22. The most important painted ceilings aside from those in Etruria and Southern Russia are the few early Hellenistic examples from Alexandria: R. Pagenstecher, *Nekropolis*, Leipzig, 1919, pp. 168 f.

23. A coffered ceiling with relief busts, one in each coffer, is known from the pronaos of the Serapeion in Miletos (3rd century A.D.): Th. Wiegand, *Miletos*, I, 7, Berlin, 1924, pp. 97 f. For Pompeii see: J. Overbeck and A. Mau, *Pompeji*, 4th ed., Leipzig, 1884, p. 349. Phyllis Williams definitely discards the old theory that some coffer-like slabs with relief busts from the decoration of the New Temple in Samothrace (last discussion: F. Chapouthier, *Les Dioscures au service d'une déesse*, Paris, 1935, pp. 177 f.) belong to a ceiling. Whether the relief from Khirbet Tannur showing a bust of Atargatis as a celestial goddess, with a crescent symbol on the ground, and a zodiac frame, belongs to a ceiling (or to a pediment), I am unable to say. In the former instance, it would represent a reduced form of the Palmyra type. In any case, it was inspired by a similar ceiling. See Nelson Glueck, *The Other Side of the Jordan*, New Haven, 1940, p. 192, fig. 122, and *A.J.A.*, XLV, 1941, p. 339, fig. 2.

FIG. 1. Venice, San Marco: East Dome

FIG. 2. Chiusi, Tomb of the Monkey: Ceiling

FIG. 3. Palmyra, Temple of Bel: Center of Adytum Ceiling

FIG. 4. Bracelet from Tarquinia

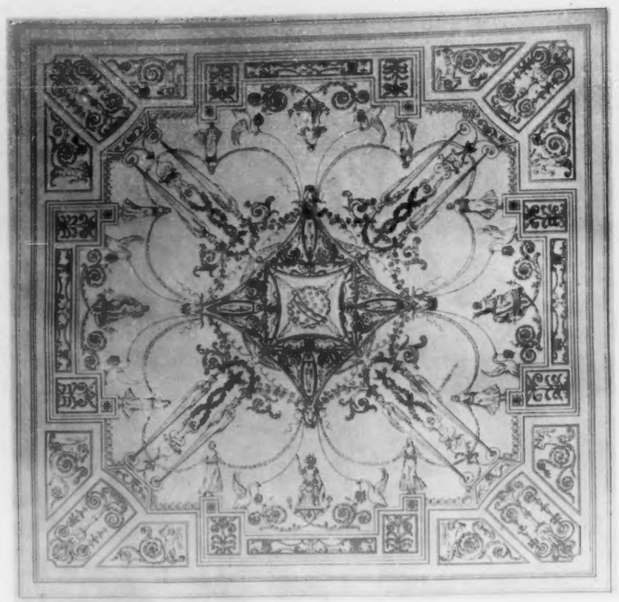

FIG. 5. Tivoli, Hadrian's Villa: Decoration of a Vault (Ponce)

FIG. 6. Bliznitza Tumulus: Painting of Ceiling

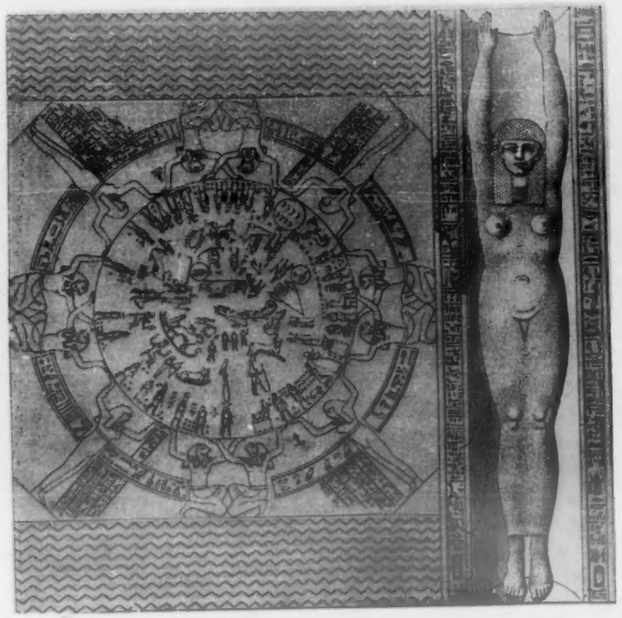

FIG. 7. Dendera: Stone Ceiling

FIG. 8. Rome, Vatican Museum: Mosaic Floor

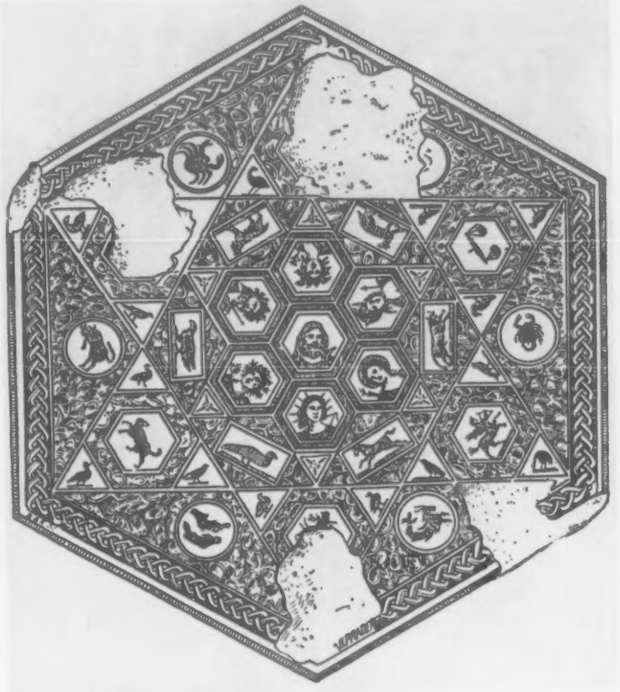

FIG. 9. Zaghouan: Mosaic Floor

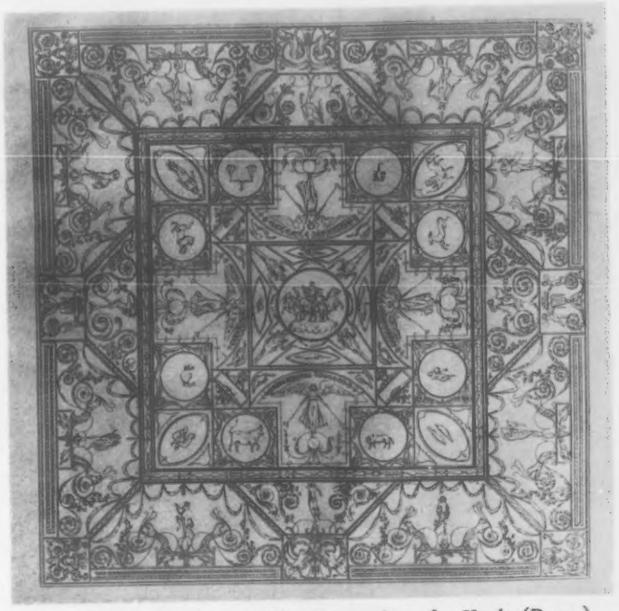

FIG. 10. Tivoli, Hadrian's Villa: Decoration of a Vault (Ponce)

logical inspiration is further emphasized by the zodiacal frame for this carpet of the planets. Later we shall discuss the literary evidence for the background of this new astrological image of the sky in Republican Rome.[24] Fortunately, we possess a precious document for another, possibly slightly earlier variety than the ceiling from Palmyra. This is the famous pre-Neronian relief ceiling from the cella of the temple in Dendera (Fig. 7).[25] Though this ceiling contains a detailed description of heaven which combines Egyptian with Babylonian and Hellenistic Greek symbols, and though its formal language is Neo-Egyptian, it has no relation to Egyptian tradition. Its comprehensive and scientific astrological approach and its formal arrangement vary. The former is intimately related to the Hellenistic-Roman astronomical and astrological description of planispheres in books and on stones;[26] the type of the canopy of heaven supported by four diagonal corner figures is derived from the old tradition, exemplified in the Tomb of the Monkey. Here, the corner supports are four women. Between the corner supports four kneeling demons lend their assistance. It should also be noted that this scheme includes the representation of the signs of the zodiac as well as those of the Dodekaoros, or stars of the Hours.[27] The comprehensive picture of the Dendera ceiling is richer and more detailed than that from Palmyra. This is primarily the result of a more elaborate description of astral phenomena, in addition to an increase in the number of supporting elements. The emphasis rests upon the "scientific" description which has been fitted into an available symbolical pattern. On another Egyptian ceiling from a tomb in Athribis,[28] also of Roman date, we see the exclusively descriptive use of scattered star symbols, without relation to another scheme. Hence the ceiling of Dendera is a mixture of an astrological map with the old ceiling symbol of the round heavens supported by diagonal corner figures. The Palmyra ceiling, on the other hand, reveals a synthesis of three originally separate traditions, in its combination of the rounded form of the sky with heavenly figures and the astronomical description. This synthesis is later modified and elaborated in various directions.

L. Curtius has already compared a later mosaic floor from Zaghouan in Tunisia (Fig. 9) with the Palmyra ceiling.[29] As he has stated, a persistent interrelationship exists between ceilings and floor decorations. In most cases, we see projected upon floors the schemes which were originally developed on ceilings. Sometimes, and as early as the first century B.C., we meet a direct representation of a ceiling on a floor,[30] as if it were reflected in a mirror. We shall meet further examples of this relationship, which adds important evidence to that derived from the scantily preserved ancient ceilings and vaults. In the case of the mosaic from Zaghouan, the connection with a ceiling of the Palmyra type is evident. We find the same arrangement of the busts of the planets, with the exception of Saturn, who here replaces Jupiter the Pantokrator. We also find the outer frame of the zodiac. But here it has been assimilated to the coffer scheme of decoration: the systematic description of the planisphere type has been sacrificed to the tendency of individual representation in framed units. A third ring of panels with animals has been inserted between the zodiac and the planets. As Curtius has pointed out, they are the sacred animals of the six outer planets. Yet we may conclude that their presence in this place is derived from the planisphere representation of the various animals of the Dodekaoros which we met in the ceiling from Dendera, and which occurs in other planispheres at the same place.[31] In other words, this floor reflects a ceiling based on two traditions: the coffered ceiling with busts, and the astronomical description. It lacks the third compound, the comprehensive symbol of the round heavens. In this case, the coffer-bust type has imposed its law on the arrangement of all the descriptive astronomical elements, and as it were, it has dissected and subordinated them.

These observations may help us to understand the peculiar character of a grandiose floor mosaic from a villa in the Alban Hills. In view of its style it can be dated about the middle of the first century A.D. (Fig. 8).[32] It clearly reflects a ceiling decoration of the basic type of the round sky supported by four diagonal corner figures, in this case nude dancing boys. The circle is a richly framed carpet. Its inner ring shows the globes of the sun and moon with

24. See below, pp. 9 f.

25. W. Gundel, *Dekane und Dekansternbilder* (*Studien der Bibl. Warburg*, 19), Hamburg, 1936, pl. 11, p. 182; F. Boll, *Sphaera*, Leipzig, 1903, pp. 159 f.; *idem*, *Sternglaube und Sterndeutung*, Leipzig, 1926, pl. 1, fig. 2; C. Ricci, *op. cit.*, fig. 15.

26. Gundel, *op. cit.*; Boll, *Sphaera*, pp. 9 f., 295 f., 303 f., pls.; Roscher, *op. cit.*, IV, p. 1492. For astrological manuscripts, see F. Saxl, *Sitz. Ber. Heidelb. Akad. Phil.-Hist. Kl.*, 1925/6, fasc. 2.

27. For Dodekaoros: Roscher, *loc. cit.*; Boll, *Sphaera*, pp. 295 f.

28. W. Flinders Petrie, *Athribis*, London, 1908, pls. 26 f.

29. *Op. cit.*, pp. 349 f., fig. 2; *Déscription de l'Afrique du Nord, Cat. du Musée Alaoui* (Gauckler and La Blanchère), Paris, 1897, pl. 1, no. 10.

30. L. Curtius, *op. cit.*; C. R. Morey, *Early Christian Art*, Princeton, 1942, pp. 31 f. See a mosaic from Terano with the representation of a coffered ceiling on the floor (1st cent. B.C.), *Mem. Am. Ac. Rome*, VIII, 1930, frontispiece. A mosaic in Piacenza shows a particularly interesting example of the representation of a dome with a cornice on which birds are perched around a central opening: through this opening the constellation of the lyre appears in the sky: *ibid.*, p. 110, pl. 39, fig. 2.

31. See above, note 27.

32. B. Nogara, *I Musaici antichi nei Palazzi Pontifici*, Milan, 1910, pl. 53; C. Cecchelli, *op. cit.*, pp. 49 f. W. de Grueneisen, *op. cit.*, pl. 3, fig. 5; C. Ricci, *op. cit.*, fig. 16. From Villa Rufinella, Tusculum. Outer spandrels modern. One might be tempted to recognize a "shield" as the round forms of ancient mosaic floors are often called. But the relationship to the corner figures leaves no doubt in this case, in spite of the fact that shields with represen-

interspersed stars on a blue ground. The sun and moon are repeated in various phases,[33] positions and degrees of visibility. Framed by these moving and changing heavenly bodies of astronomical description, the bust of Minerva appears on a purple ground in the inner round disk which is to be interpreted as the ethereal sphere. She is here the Pantokrator, the supreme essence. Her nature as ruler of the sky is indicated by her stormy appearance and windswept aegis. Though the type is basically a combination of the same three roots which were already combined in the Palmyra ceiling, several themes are new and remarkably important for future development. In the first place, the element of time has been introduced everywhere: it manifests itself in the dancing and rotating figures of the corner supports as well as in the descriptive succession of the phases of sun and moon, and it culminates in the stormy image of the goddess. Secondly, the Pantokrator is here not a well established heavenly body like Jupiter or Saturn. Because of a peculiar speculative revelation, another deity has here been appointed to the supreme rôle, as will happen later to Christ. It is evident that this substitution reflects a new religious unrest and search for all-powerful divinities: precisely in the case of Minerva, it manifests itself in the next generation in her exaggerated worship by Domitian. This unrest relates to the dynamic artistic experience which created the fourth Pompeian style with its miraculous visionary appearance of flying figures on walls, in unexpected openings, and on ceilings. Flying figures occur on ceilings as early as the Julio-Claudian age, as in the stucco reliefs of the basilica near Porta Maggiore.[34] The motif of the illusionistic opening in the ceiling appears in the center of the vault of the Arch of the Sergii in Pola, where an eagle carries a snake to heaven.[35] We see the increasing intensity of such illusionistic visions in several ceilings of the Golden House of Nero to which we shall return later.[36] And this development culminates in the *Apotheosis of Titus* in an illusionistic opening of the vault, where he appears as a new star and is obliquely carried up to heaven.[37] With this background in mind we can understand the character of the Vatican mosaic.

Since the ceiling decorations of this period in painting, stucco, and mosaic are lost, with few exceptions, this floor is of great importance. It marks considerable progress in the direction of late antique artistic experience. Additional evidence for celestial cupola decoration in this age will be submitted later. Unfortunately, it does not help us to trace the typological and artistic development in detail. But we do possess in faithful eighteenth-century reproductions two celestial ceilings, probably in stucco, from the Villa of Hadrian.[38] We may trust the usually reliable etcher Ponce, to whom we owe these etchings, for he can hardly have been aware of the importance of what he reproduced. These two ceilings illustrate the culmination of the development which we have traced, toward a fusion of the symbolical elements of heaven with astrological description and the representation of divinities. They are, also, the most comprehensive documents of celestial speculation known to us from ancient art. Strangely enough, they do not seem to have been analyzed or discussed by modern scholars.

The main features of one of these ceilings (Fig. 5) have already been mentioned. We see a mixture of the three traditions: the carpet of heaven with its diagonal supports; the appearance of heavenly divinities; and astrologically descriptive elements. But all these are elaborated in a playful way, in repetitions and insertions and in the "grottesque" manner of the preceding fourth style with its mixture of abstract ornament and visionary illusion. For the first time the central globe with stars appears on a ceiling as an illusionistic body. It is supported by the same four youthful dancers whom we met in the Vatican mosaic. This central motif thus represents a mixture of the tradition of the round heavens with diagonal corner supports and the astronomical description — this time in the form of a globe instead of a planisphere — of which the fringed edge, however, reveals its derivation from the old canopy (cf. Fig. 2). The richly embroidered carpet around it has the form of an

tations of heaven have their own long history: O. Brendel, *Antike*, XII, 1936, pp. 272 f.

33. Compare below, Figs. 10, 45, pp. 7, 15.

34. See for general discussion and bibl. J. Carcopino, *Études romaines*, I, Paris, 1925.

35. *Bull. commun.*, LXII, 1934, pp. 115 f.

36. Below, pp. 11 f., 13 f., 15 f. See also note 207.

37. *Bull. commun., loc. cit.*

38. Ponce, *op. cit.*, pls. 5, 9; P. Gusman, *La villa impériale de Tibur*, Paris, 1904, pp. 234 f.; figs. 344, 346. K. Ronczewski, *Gewölbeschmuck im römischen Altertum*, Berlin, 1903, pp. 22 f., questioned whether the dome of Ponce's drawings belonged to Hadrian's Villa. The only recent writer on this subject, F. Wirth, *Röm. Mitt.*, XLIV, 1929, pp. 125 f. (also *Römische Wandmalerei*, Berlin, 1934, pp. 74 f.) has rejected these drawings as not belonging tc Hadrian's Villa without any sensible reason. The basis for this is the fact that the complicated patterns of these ceilings do not fit his oversimplified theory of Hadrianic style as his theory, in turn, would not fit the upright ruins of such complicated structures as the Piazza d'Oro and the Little Palace there. This theory which is a crude transfer to Roman art of the antithetic categories of H. Woelfflin, eliminates everything which does not fit into the scheme. Wirth's statement that the decorations mentioned in old writers (with the exception of those drawn by Ponce or Bartoli, who, to be sure, was somewhat less reliable) are still recognizable (*Röm. Mitt., loc. cit.*, p. 125) is contradicted (though this has been skillfully camouflaged) by the evidence which he himself gives. The fact is that, of the five places where Piranesi indicates stucco ceilings, only one entire ceiling, and a fraction of a second are now preserved. One of these was also drawn by Ponce (*op. cit.*, p. 141). The destruction of numerous decorations between Piranesi and Ponce, on the one hand, and Penna (1831), on the other, is certain. Because a circle is allegedly not classicistic, Wirth (*Wandmalerei*, p. 76) declares that there were no circle patterns in Tivoli. As he nevertheless finds one himself, he attributes it to later restoration! His statements about the development of vaulted construction are so obviously wrong that they do not require discussion.

octagon with concave sides. Its scroll-work and figures of putti and heraldic goats may be purely decorative. This is less likely for the four female figures in mandorla frames; they clearly appear in four different degrees of clothing ranging from nudity to complete dress. Evidently they allude to the changing seasons. The diagonal corner supports with their combination of the herms of Pan the great god of nature, with the giants of the earth below and the celestial Sirens above have already been discussed. The fact that the supports pierce the airy space is indicated by birds and hanging garlands. The coffered ceiling has been reduced to a remnant in an outer frame through which the appearance of the cosmic structure is seen. Above it, eight dancing girls move in a chorus united by garlands connecting them with the celestial carpet. Between them sit four figures — not simply busts — of the planetary gods Jupiter, Mars, Venus and Luna.[39]

In the second ceiling (Fig. 10) we see a similar mixture of an even more comprehensive and systematic character.[40] The central motif is the heavenly circle with diagonal corner supports in a large square. The circle is filled with Jupiter or Sol as the Pantokrator on a quadriga. The corner supports seem to be the herms of Pan encountered in the preceding ceiling. Around this central motif and separated from it are the twelve signs of the zodiac, as in the mosaic from Zaghouan, broken up into individual units in remnants of coffer fields, three in each corner. This division seems to be related to the appearance of four winged angel-like figures who blow trumpets and stand on globes. Ponce has included even the detail that the globes differ in size: this evidently symbolizes the changing phases of the sun[41] and it seems clear that we have here four seasonal divinities or personifications, who separate the quarters of the year, each of which is characterized by three signs of the zodiac. The small fields in the inner square are filled with eight oval and rectangular panels; each bears the picture of an animal. These animals constitute an unusual group: one recognizes a snake, a bug, a mouse and a bird in the outer circle. They seem to be the scattered remnants of a cycle of the Dodekaoros.[42] The inner animals may refer to other stars. An outer frame around the large square includes floral patterns, griffins and tigers, which may be purely decorative or may allude to a connection between Bacchic creeds and astral religion.[43] The twelve nude dancing maidens tempt us to recognize the twelve hours of the day.[44]

These two ceilings reveal several points, intellectual as well as formal, which are generally important to the development of our theme. In respect to content they show a systematic fusion of religious figures and cosmological speculation in a predominantly astrological sense. The sphere of heaven and the Pantokrator are the central figures of these symphonic visions of a universe which, in various subordinate astral and mythological figures, alludes to the eternal creative power of nature and to ever moving time. Artistic speculation could move in various directions from this point: it could expand into a kind of astronomical calendar or astrological horoscope, or into a representation of the religious order of the world of time and space as governed by heavenly persons and expressed in their sacred hierarchy. Both developments actually took place in the late antique world, and, together with revivals of the earlier simpler and more unified types, their tendencies define the variety of later formulae. A comparison of these two ceilings with earlier tradition reveals a tendency toward centralization in two sharply contrasting schemes: in the first ceiling (Fig. 5) this centralization has been achieved by an emphasis on the diagonal supporting elements which produces a simple star pattern; the second ceiling shows a basically concentric scheme in which the diagonals are suppressed and instead, the distribution of figures and ornamental units emphasizes a central cross parallel to the sides. These varieties of an increasing centralization are of course part of a general decorative development which cannot be discussed here. But inasmuch as these tendencies are connected with the ideological trend discussed above, it should be noted that the phase which we meet here, complicated as it is, opens the way in various directions: either toward an increasing emphasis on the cross-pattern, be it diagonal or vertical-horizontal, or toward a pattern of radiating figures or decorative units, or, finally, toward a combination of concentric rings. These tendencies are recognizable in changing combinations with ever increasing centralization during the later second and third centuries A.D., as we know from the history of catacomb and pagan tomb ceilings. The debased style of most sepulchral decorations of that age, and particularly of the catacomb paintings, makes their evidence for general stylistic development less reliable than the conclusions drawn from them by modern writers would in most cases suggest. In the opinion of this writer, the representation of saintly figures and eschatological legends alluding to heavenly redemption, in connection with the prevailing use of the pattern with the circle in the center

39. Jupiter, Mars, and Venus are easily recognizable. The fourth figure (between Mars and Venus), a half nude woman with her left arm raised while a bird approaches from her right, can hardly be any other than Leda as the Moon Goddess. Ponce, not clearly recognizing the bird, made it a peacock, which, as Juno's bird, would be incompatible with the nudity of the figure.

40. Ponce, *op. cit.*, pl. 9; Gusman, *op. cit.*, p. 235, fig. 346.

41. See K. Lehmann-Hartleben and E. Olsen, *Dionysiac Sarcophagi in Baltimore*, Baltimore, 1942, pp. 48 f. Compare also p. 5, Fig. 8, and below, p. 15, Fig. 45.

42. See above, p. 5, note 27.

43. See above, note 41.

44. The four horae-seasons and the horae-hours occur in one and the same heavenly painting centuries later in the cupola of the Bath in Gaza: see below, p. 23, Fig. 63.

and diagonal figures, is primarily related to the long line of celestial representations on ceilings of which only a limited number of monumental examples is preserved. We shall later see certain connections between details of catacomb ceilings and this tradition. Like the similar loose reflections of celestial ceilings in pagan tombs of the period, they point to the catacomb paintings as vague adaptations of that general idea to Christian eschatological ideology, in the sphere of the popular symbolism of hymns and prayers. In that sense, the numerous catacomb ceilings are forerunners of the Christian heavenly ceilings of ecclesiastical art which, from the fourth century on, continue the pagan tradition of celestial ceiling decoration.

Although no monumental ceiling decorations with the representation of heaven are preserved from Rome after Hadrian's Villa, we nevertheless have evidence for their existence. The most important document is the narrative of Dio Cassius pertaining to a part of the imperial palaces on the Palatine: ". . . he [Septimius Severus] knew that he was not to return [from Great Britain]. He knew this above all from the stars under which he had been born. In fact, he had paintings of the stars made on the ceilings of the halls in the palace in which he used to give judgment. They were arranged in a way to be seen by everybody, with the exception of that section [of the sky] which, as [astrologers] express it, 'observed the hour,' when he first emerged to light; for this [section of the sky] he had represented in a different manner in relief on both sides [of his throne]."[45] It is certain from this somewhat obscure text that Severus had representations of the sky on the vaults, probably at the apsidal ends in the basilicas where his tribunals stood. These representations were either in fresco or in mosaic. This fact is of great importance since it indicates that not only the celestial decoration of vaults in general, but also the specific vision of heaven in the vault of an apse, which we later find in Early Christian churches, had been developed by this time, that is, about 200 A.D. Beyond that, the text does not enable us to say whether the sky was represented with astronomical symbols or whether it included illusionistic elements or divine figures. The direct transition from the pagan custom to the Christian interpretation of the ceiling as heaven within the same sphere of imperial palace decoration is documented by the famous passage in Eusebius referring to the decoration of a ceiling in the palace of Constantine the Great with a cross as the symbol of Christian religion.[46] It is hardly necessary to remind the reader of the continued use of the cross symbol in the center of ceiling decorations in Early Christian and Byzantine art, and of its intimate relationship to a starry ground, sphere or other celestial surroundings (Fig. 11).[47] But it is interesting to note at this point that in Christian art the cross does not appear in this place simply as the symbol of Christ, the source of light, the dominating heavenly body. According to literary evidence, it is also connected with the cosmic structure as an astronomical center with its four branches indicating the points of the compass.[48] As late as the eleventh century A.D., the distinctions of color in the sections of heaven divided by the arms of the cross monogram reflect the changing phases of time (Fig. 12).[49] We have seen before how such an emphasis on the rotation of time was prepared by earlier Roman celestial ceilings.

From the second century on, there is evidence for the increasing preoccupation of monumental decorative art with the cyclic movement of time in the growing number of calendar representations on mosaic floors.[50] In the round form, their connection with and derivation from this tradition of heavenly images on the ceiling are very likely.[51] And it is here that we can see the first clear evidence of a radiating pattern. Unfortunately, in what seems to be the earliest example of this scheme, a late second-century mosaic floor from Antioch (Fig. 13), the central bust of a celestial ruler is no longer preserved.[52] The twelve months are grouped around it in radial units, while the outer spandrels are filled with busts of the Seasons. In addition to its pro-

45. E. Maass, *Die Tagesgötter*, Berlin, 1902, pp. 143 f.; Gundel, *op. cit.*, p. 182. The translation above and the resulting interpretation differ from that of Maass and Cary (Loeb ed.). They translate the last sentence: "for this portion he had not depicted in the same way in both rooms." The Greek text is: "τοῦτο γὰρ οὐ τὸ αὐτὸ ἑκατέρωθι ἐνετύπωσεν." The verb used differs from ἐνέγραψεν which is used before for ceiling decoration, and it points to a different technique, relief, instead of painting. In addition, a difference of place is indicated by the contrast between that part which people could see, and that which is "excepted" from the view of the spectators facing the tribunals. A change in the representation of that section of the sky would not have made it "invisible" to them.

46. *Vita Constantini*, 3, 49. The cross was a *crux gemmata* on gold ground in the dominating central unit of a coffered ceiling, possibly a dome. M. Sulzberger, *Byzantium*, II, 1925, p. 418, however, thinks that this was an actual object, i.e. a labarum, an interpretation which the text does not allow.

47. P. Friedländer, *Johannes von Gaza und Paulus Silentarius*, Leipzig, 1910, p. 188; A. Muñoz, *L'arte*, XI, 1908, p. 441; G. Krahmer, *De Tabula Mundi ab Joanne Gazaeo descripta*, Diss., Halle, 1920, p. 57. For the vault in Albenga (Fig. 11) and related motifs, see Morey, *op. cit.*, pp. 145, 273 with bibl.

48. G. Krahmer, *op. cit.*, p. 3.

49. Th. Schmit, *Die Koimesiskirche von Nikaia*, Berlin, 1927, pl. 28.

50. See J. Ch. Webster, *The Labors of the Months*, Princeton, 1938. For the calendar element in cupola decoration, see below, pp. 14 f. The relationship of the calendar picture to astrological representation is common: Petronius, *Cena Trim.*, 30. Here, as well as in an incised calendar from the region of the Golden House, the planets are combined with the calendar. In the Golden House, they appear as busts over a circle with a central rosette and the radial fields of the zodiac (compare Figs. 3, 9, 15, 16): K. W. Kubitscheck, *Grundriss der antiken Zeitrechnung*, Munich, 1928, p. 30 with bibl.

51. For the calendar significance of the Early Christian mosaics in the dome of St. George in Saloniki, see Morey, *op. cit.*, p. 143.

52. Webster, *op. cit.*, p. 119, pl. 2; *Antioch on the Orontes*, II,

FIG. 11. Albenga, Baptistery: Mosaic Decoration of Vault

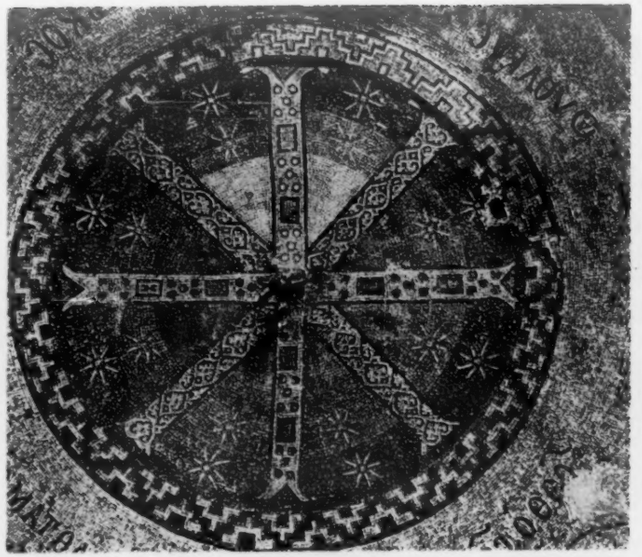

FIG. 12. Nicaea, Church of Koimesis: Center of Dome in Narthex

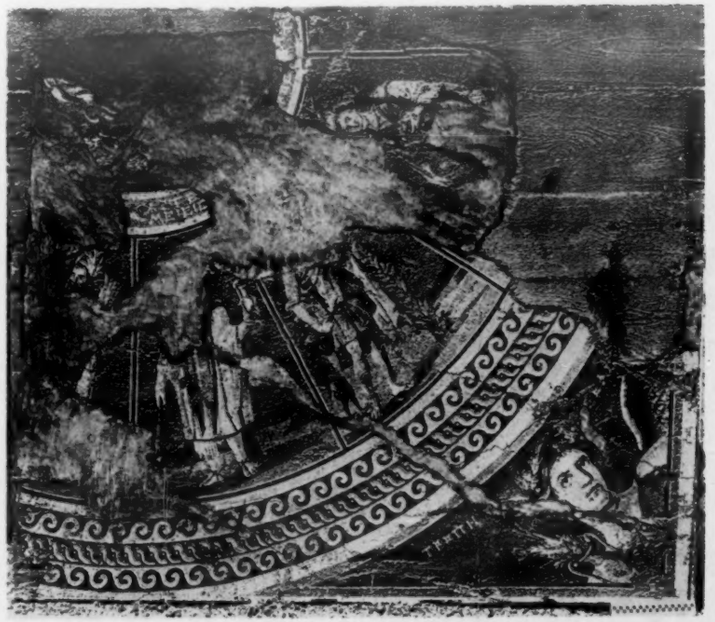

FIG. 13. Antioch: Mosaic Floor

FIG. 14. Münster near Bingen: Mosaic Floor

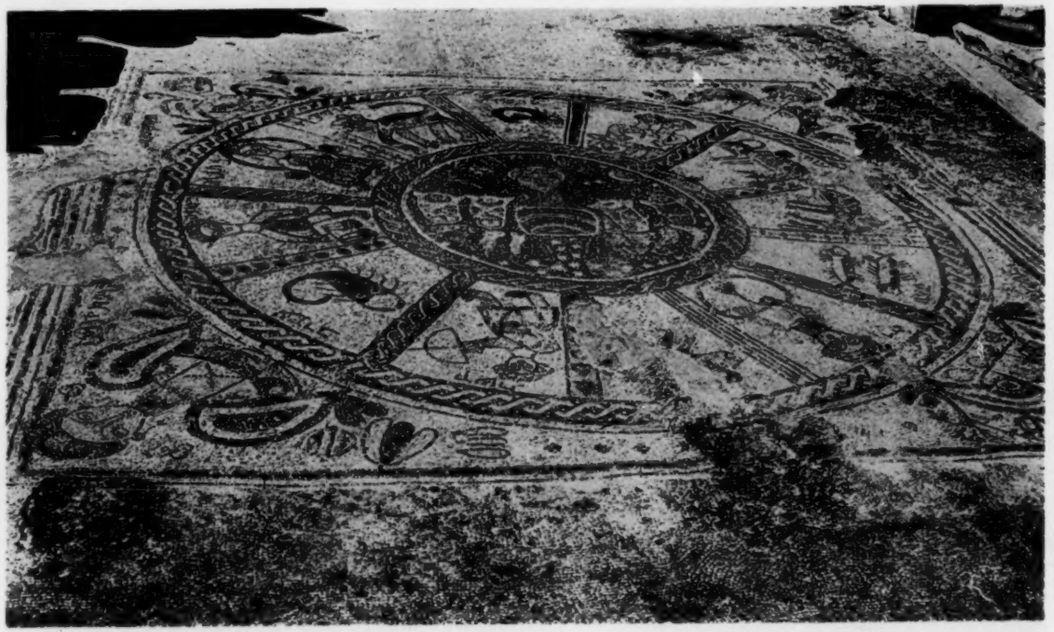

FIG. 15. Beth Alpha, Synagogue: Mosaic Floor

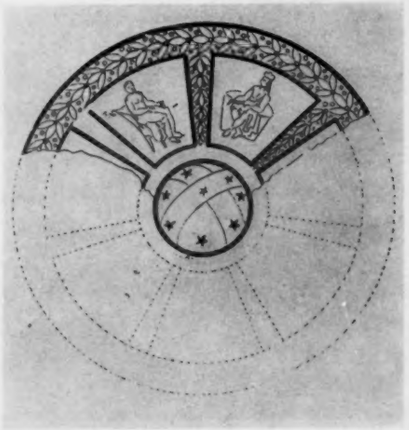

FIG. 16. Gaul: Mosaic Floor

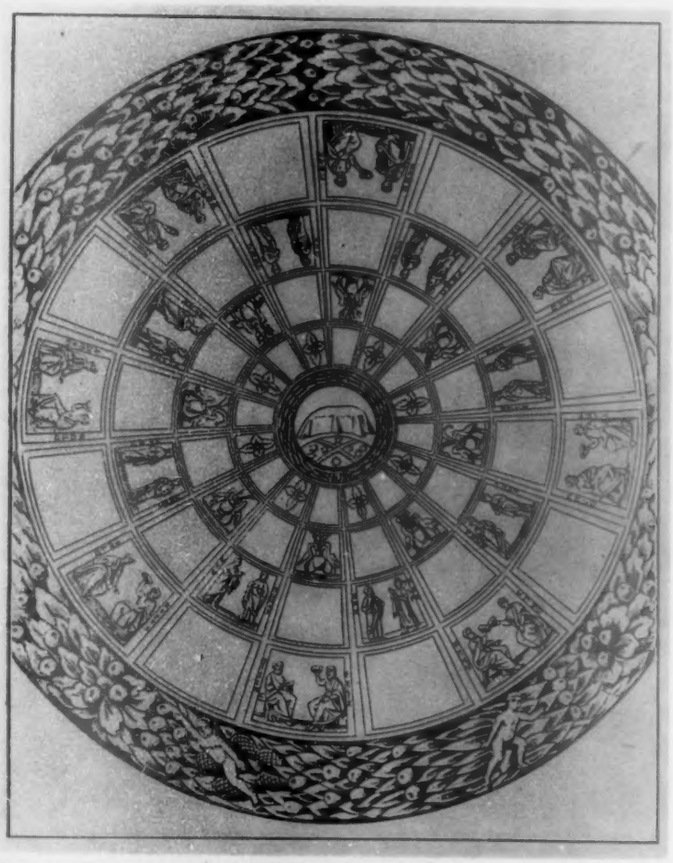

FIG. 17. Capua, San Prisco: Decoration of Dome

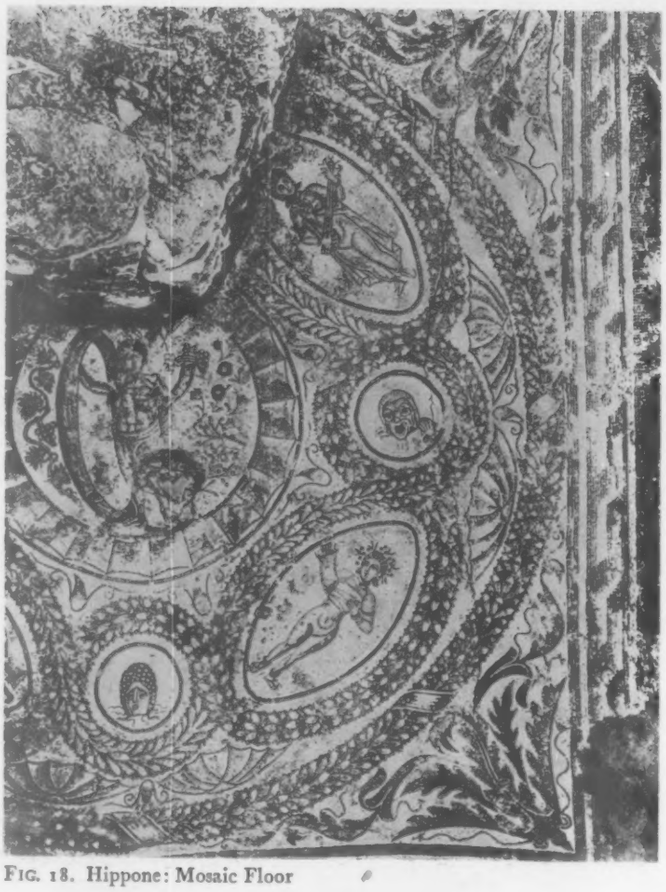

FIG. 18. Hippone: Mosaic Floor

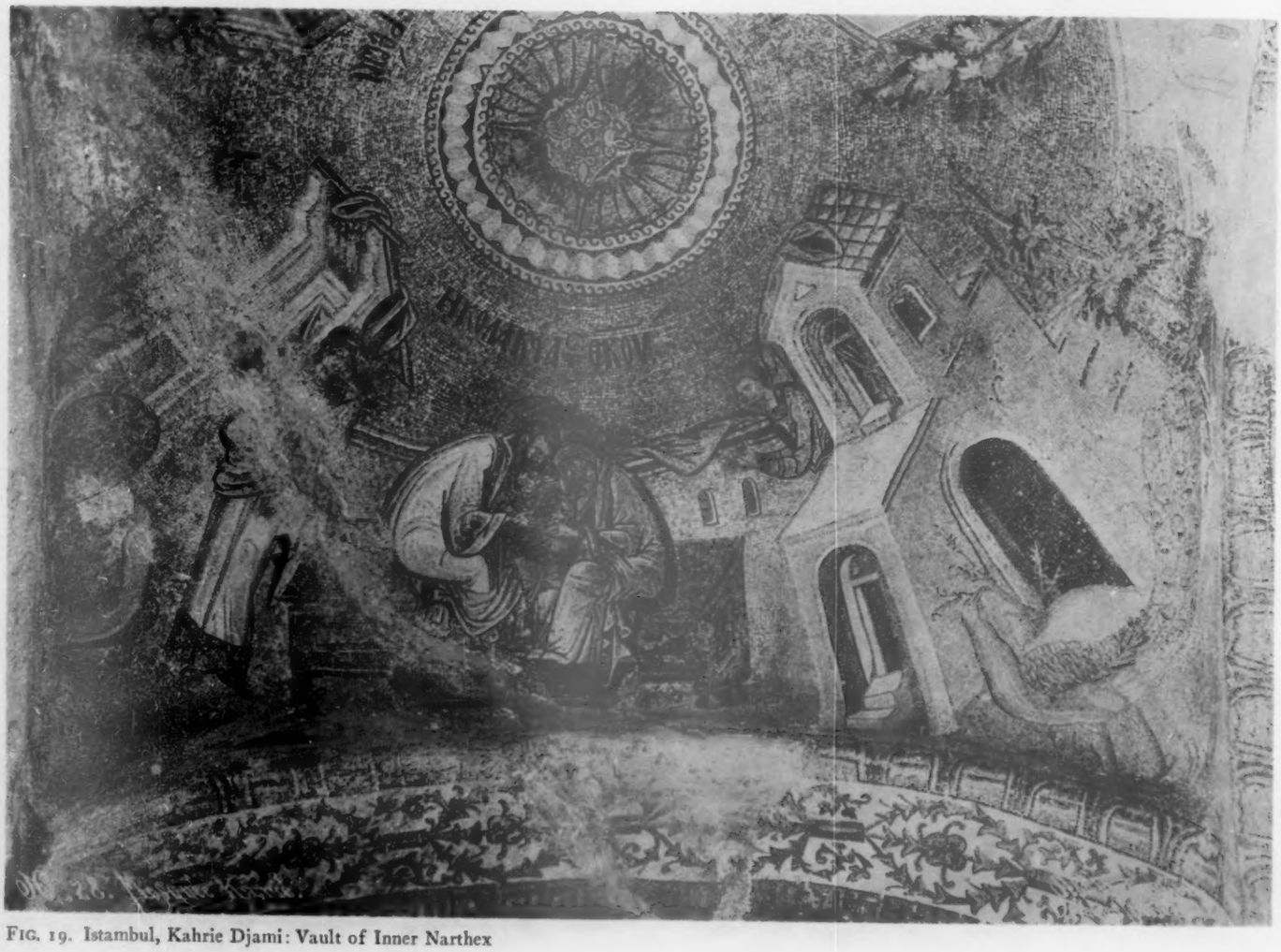

FIG. 19. Istambul, Kahrie Djami: Vault of Inner Narthex

gressively centralizing tendencies, the division into compartments, one for each month, may have been inspired by the earlier (Fig. 3) arrangement of celestial bodies in coffer compartments. Many interesting relationships are to be found here. In a second-century mosaic floor from the Rhineland, we see the zodiac frame around a heavenly representation of Helios (Fig. 14).[53] But the single signs of the zodiac are no longer united in a ring, as they were in Dendera and Palmyra (Figs. 7, 3). They are separated into single compartments[54] as we found them in the later mosaic from Zaghouan (Fig. 9) and in a ceiling from Hadrian's Villa (Fig. 10), where they were inserted into coffers as individual units. The late antique development from the mosaic in Bingen (Fig. 14) to a fully radiating scheme of the kind already familiar in the *calendarium* floor from Antioch (Fig. 13) is reflected in the mosaic of the Synagogue in Beth Alpha (Fig. 15),[55] which again shows Helios framed by the zodiac. It seems likely that the mosaic from Antioch and other similar representations, as well as these heavenly floor mosaics, more or less reflect ceiling decorations. This connection is further borne out by another mosaic floor, this time from Gaul, which as far as I can judge from the style, may well belong to the second century A.D. (Fig. 16).[56] It shows the sphere of heaven in the central disk, in a fashion very similar to the representation in the center of one of the ceilings from Hadrian's Villa (Fig. 5). This starry globe appears again in the center of the Early Christian dome of San Prisco in Capua (Fig. 17).[57] Around it, on the mosaic floor, we see the seven planets in separate compartments, as if they were the "houses" of astrological speculation. While this floor undoubtedly reflects a heavenly ceiling, another mosaic, in this instance of the third century A.D. and from Hippone in Algeria (Fig. 18), gives evidence of the relationship between floor representations of the annual cycle and ceiling decoration.[58] Here, a representation of Annus(?) holding the zodiac[59] appears in a circle in the center of a canopy with concave edges: the outer circle shows personifications of the four Seasons in diagonal single compartments. The formal pattern has analogies not only in some catacomb ceilings[60] but also in an ornamental stone ceiling of earlier origin in Palmyra.[61]

Scanty and indirect as the evidence for the development of late Roman visions of heaven on ceilings often is, it suffices to show that an unbroken continuity existed between antique and Christian monuments of this kind. It also indicates an increasing preoccupation with a well established cosmic order, a certain tendency toward systematic illustration of that comprehensive order, and a formally correlated centralization. If the derivation of the Christian vision of heaven from an unbroken and ever growing stream of pagan tradition is obvious, the connection is further borne out by the persistence and reorganization of specific elements of classical tradition. Two major features, the very two which formed the starting point of our observations, deserve particular attention: they are the motif of the canopy of heaven, and the character of the supporting figures.

II

Our investigation began with a general comparison of two widely separated examples of heavenly representation: the ceiling of an archaic tomb in Chiusi (Fig. 2) and one of the domes of San Marco (Fig. 1). This comparison first considered the general analogy of the round symbol of heaven with its winged corner supports. Returning once more to these two monuments, we may now stress a far-reaching difference: the Etruscan ceiling shows a simple carpet of red, symbolizing light, with a floral ornament of symbolical character and a fringed edge of little semicircles.[62] The cupola of San Marco shows an infinitely more

Princeton, 1938, pl. 52, no. 71 Panel E. The bearded bust in the center may be Saturn, Jupiter, or Annus.

53. F. Quilling, *Westdeutsche Zeitschrift*, XX, 1901, pp. 114 f., pl. 3.

54. Compare also the relief from Khirbet el Tannur, above, note 23.

55. E. L. Sukenik, *The Ancient Synagogue of Beth Alpha*, Jerusalem, 1932, pp. 35 f., pls. 10 f. (also for the similar mosaic of the Naaran synagogue); *idem*, *Ancient Synagogues in Palestine and Greece*, London, 1934, pp. 28 f.; R. Wischnitzer-Bernstein, *Gestalten und Symbole der jüdischen Kunst*, Berlin, 1935, pp. 127 f. G. M. Hanfmann, *Latomus*, III, 1939, p. 112. For mediaeval zodiac mosaic floors, see P. Clemen, *Romanische Monumentalmalerei in den Rheinlanden*, Düsseldorf, 1916, p. 167. For astrological manuscripts, F. Boll, *Sternglaube*, p. 8, fig. 15.

56. *Inventaire des mosaiques, Gaule*, 203, Paris, 1909–11. For the sphere of heaven with crossed rings, see O. Brendel, *Röm. Mitt.*, LI, 1936, pp. 55 f. A developed scheme with radial fields around a central section occurs in several catacomb paintings of the 3rd century: Wilpert, *op. cit.*, pls. 55, 96.

57. *Architettura ed arti decorative*, II, 1922, p. 18. Here the sphere is only partially visible and over it hangs a canopy. Cecchelli, *op. cit.*, p. 14, not knowing the antecedents, was unable to make sense out of this and suspected the 17th-century draughtsman of misinterpretation.

58. *Inventaire des mosaiques, Algérie*, 41.

59. Compare for this motif, Alda Levi, *La patera di Parabiagio*, Rome, 1935, pls. 1–5, pp. 8 f.; G. Calza, *La necropoli del porto di Roma*, Rome, 1940, pp. 183 f., fig. 92. Dr. Doro Levi tells me that with others he is inclined to interpret the figure not as Annus but as Aion and that he will submit evidence for that interpretation in a forthcoming study.

60. Wilpert, *op. cit.*, pl. 72.

61. Th. Wiegand, *Palmyra*, Berlin, 1932, pl. 44 (upper right figure).

62. The question arises whether the motif is derived from oriental prototypes: on a stele of Gudea (*Mon. Piot*, XII, 1909, pl. 1) an enormous disk with similar projections on the periphery is supported by two flanking demons. Heuzey's (*ibid.*, p. 12) explanation as a chariot wheel is less convincing than that of those who "rêveront d'un emblème solaire." This fringed edge later left its traces, in many cases in arches or garlands surrounding the periphery of the celestial circle; see our Figs. 5, 10, 29, 31, 39, 42, 46, 50. See also the central veil of the Tomb of Hermes (*Not. sc.*,

complicated system: the floral elements are limited to the outer fringe; the red ground has been supplanted by the gleaming and visionary late antique gold; heaven is filled with figures; and in its center we see, as it were, another carpet, the firmament with stars from which the bust of the Pantokrator emerges, framed by a rainbow border.[63] We have seen how, in the Roman period, the actual representation of the sphere of heaven with stars, heavenly figures, and busts entered and expanded the simple earlier symbolism. In the course of this development, it would seem, the old carpet symbol was definitely abandoned for new narrative forms. But even here the rainbow frame of the sphere of heaven with its alternatingly folded sections still retains the idea of a canopy. If we now look at another late Byzantine monument, a vault in the inner narthex of Kahrie Djami in Constantinople,[64] we meet another and, at first sight, rather bewildering analogy to the ceiling from Chiusi (Fig. 19): within the context of this picture, the vault shows a circular canopy with several concentric borders in the sky. In its center, the very motif of the Chiusi ceiling with four leaves sprouting from a square of stems with concave sides recurs after more than 1800 years. But the form is more complicated: the leafy star is applied to a larger square with concave sides, and this pattern is silhouetted against a curious shell-like inner canopy, the projecting points of which touch the innermost of the three concentric outer textile borders. By a happy coincidence, in the midst of the long road leading from one monument to the other, we are again able to show a tangible connection between them. In a mosaic floor of the third century A.D. in Trier (Fig. 20), [65] we meet the system of the central canopy of Kahrie Djami already fully developed with only slight modifications in details. It is obvious that these coincidences imply a long and continued development of the canopy motif. The two mediaeval examples which we have compared with their initial background constitute two divergent results of that evolution: one tending toward visualized figurative representation, in which the carpet character has almost been forgotten; the other toward rich embroidered decoration which obliterates the meaning of the original simple symbolism. Two factors alien to the representation of heaven on ceilings have influenced this development: the more or less illusionistic representation of canopies on ceilings, in general, and the actual use of canopies symbolizing heaven in temporary structures.[66]

Leaving aside the question whether any of the earlier Etruscan painted tomb ceilings actually represented the roofs of tents, we have evidence for the illusionistic imitation of canopies in painted ceilings as early as the Hellenistic age. In a tomb of the Aufudshi necropolis in Alexandria (Fig. 21),[67] the ceiling is painted with an imitation of an open pergola covered by a carpet having a central red square and several borders. It is interesting to read that the central border zone showed busts, certainly of gods, in coffer-like fields, while the outer border had a frieze of figures. In the very center there was a circle, and in the circle a wheel-like ornament was preserved. This ornament is evidently a star: it occurs again, about seven centuries later, among a great variety of star patterns in an interesting Early Christian mosaic (Fig. 22).[68] Here the four rivers of Paradise emerge from the center of heaven through the starry sky. The Aufudshi ceiling thus represents an awning decorated in the center with the heavenly sphere which appears as a flat circle, and with busts of divinities inserted into imitations of the coffers of a ceiling. In other words, the carpet which is shown spread over the lattice-work of the pergola has absorbed elements of actual ceiling decoration — an interesting example of reciprocal influence. Further cases of the imitation of canopies on the ceilings of Hellenistic tombs have been discussed by R. Pagenstecher.[69] They are found in such widely distant regions as Southern Italy, Alexandria, and Southern Russia. It may be safely assumed though evidence is lacking, that similar motifs were used in private houses and palaces of the period. Thus far we possess only one imperial example of the representation of a large carpet covering the entire room over a central beam, from Hadrian's Villa in Tivoli.[70] The custom is important, inasmuch as it may easily have contributed ornamental embroidery motifs to the representations of the canopy of heaven. It may also have facilitated the expansion of loosely associated embroidery motifs into the general realm of ceiling decoration.

More important for our discussion is the actual use of

1923, pl. 14; Wirth, *Wandmalerei*, pl. 50; Tomb of the Nasonii: *Jahrb. arch. Inst.*, XXV, 1910, Beilage 2). On the other hand, the curious arched fields with the planets' children in the Brindisi planisphere (above, note 25) may be derived from this edge with its little arches.

63. Compare a rainbow border in the mosaic of Casaranello (Wilpert, *Mosaiken*, pl. 108) and Iris supporting the rainbow in the cupola decoration described by John of Gaza: below, p. 23, Fig. 63.

64. Th. Schmit, *Kahrie Djami* (in Russian, 1924), Munich, 1906, pl. 24.

65. *Germania Romana*, 2nd ed., II, pl. 8, fig. 2.

66. See V. Chapot, in Daremberg and Saglio, *Dictionnaire*, Paris, 1897–1917, *s.v. velum*, pp. 676 f.; G. Rodenwaldt, "Cortinae," *Nachrichten der Göttinger Gesellschaft der Wissenschaften, Phil.-hist. Kl.*, 1925, pp. 37 f.

67. M. Rostovtzeff, *op. cit.*, pl. 25, fig. 2; R. Pagenstecher, *Nekropolis*, Leipzig, 1918, p. 181, fig. 111. See in general, *ibid.*, pp. 173 f.

68. From Die; *Inventaire des mosaiques, Gaule*, 131. For connections with ceilings, compare the decoration of a vault of the church of the monastery in Gurk (13th cent.) in W. Borrmann, *Aufnahmen mittelalterlicher Wand- und Deckenmalereien in Deutschland*, Berlin, 1897/8.

69. *Loc. cit.* For Southern Russia, M. Rostovtzeff, *op. cit.*, pl. 14.

70. F. Wirth, *op. cit.*, p. 69, fig. 30.

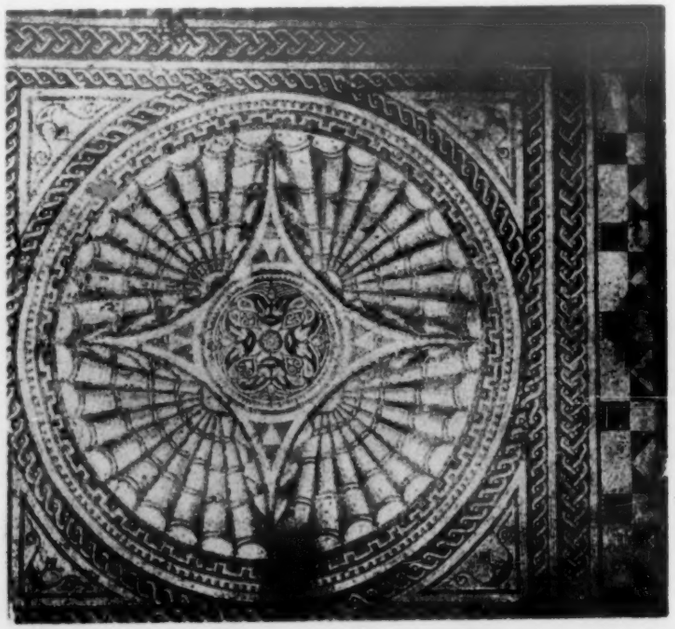

FIG. 20. Trier: Mosaic Floor

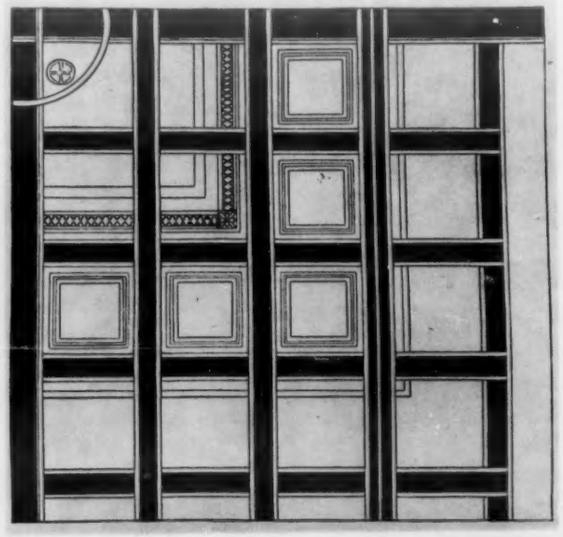

FIG. 21. Alexandria: Corner of a Painted Tomb-Ceiling

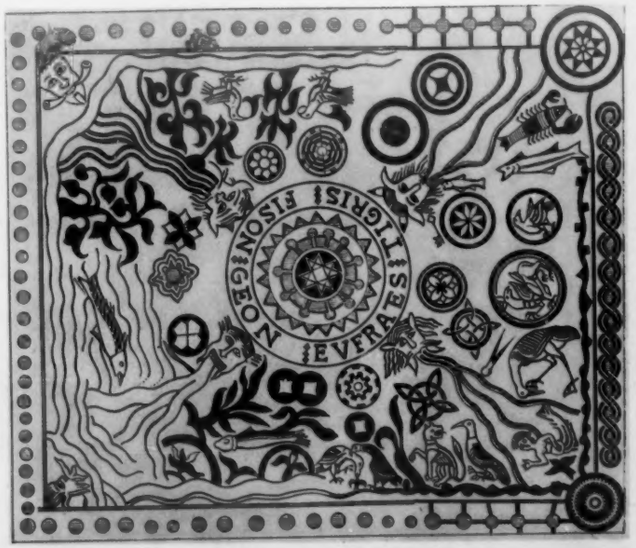

FIG. 22. Die: Early Christian Mosaic Floor

FIG. 23. Aquila, Museum: Funeral Relief

FIG. 24. El Bagaouat: Painted Decoration of Dome

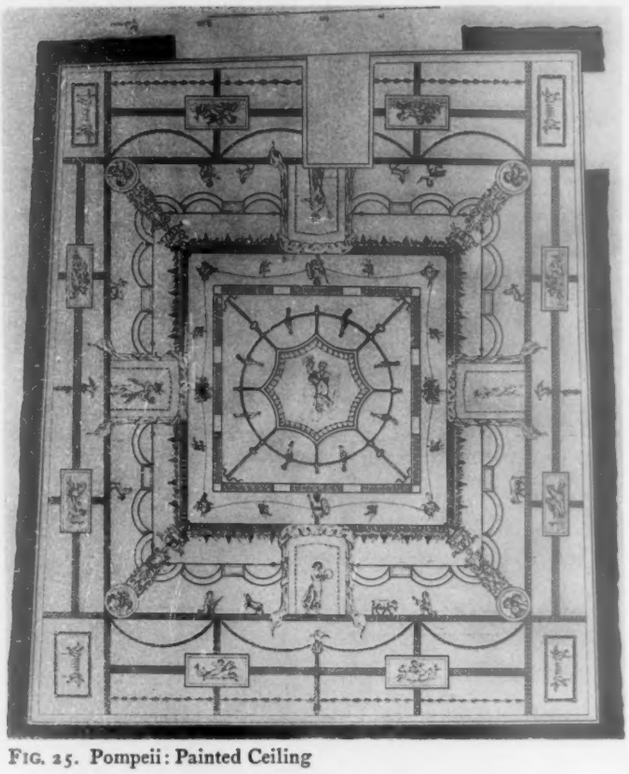

FIG. 25. Pompeii: Painted Ceiling

FIG. 26. Etruscan Mirror: Meleager and Dioscures

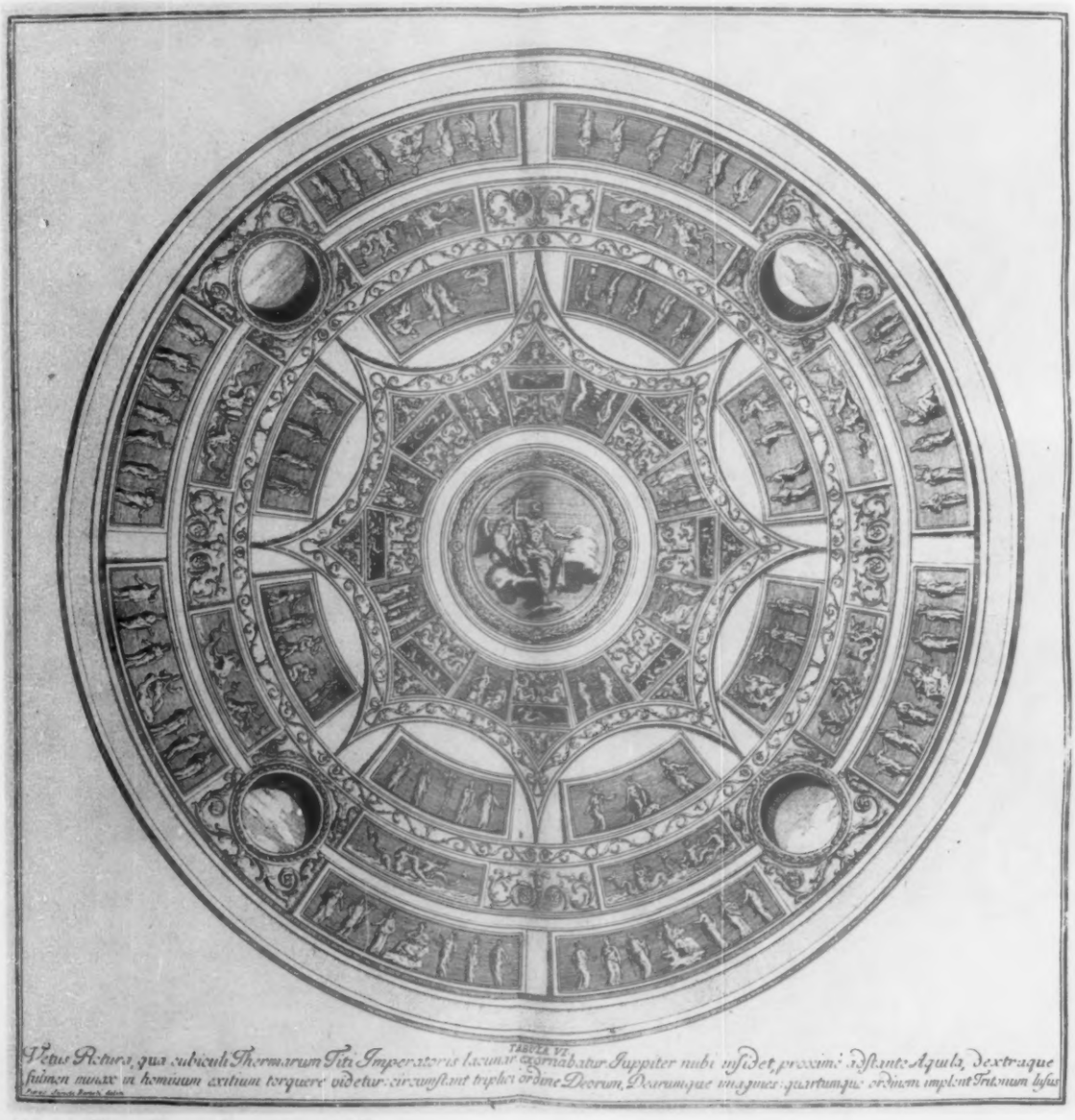
TABULA VI.
Vetus Pictura, quæ subiculi Thermarum Titi Imperatoris Lacunar ornabatur. Iuppiter nubi insidet, proximè adstante Aquila, dextraque fulmen munere in hominum exitium torquere videtur: circumstant tripli ordine Deorum, Dearumque imagines: quarum ordinum impleri Fratrum lusus

FIG. 27. Rome, Domus Aurea: Stuccoed Dome

heavenly symbols on temporarily erected canopies. This custom goes far back in antiquity; became widespread during the Hellenistic and Roman ages; and almost certainly survived in the temporary canopies erected over the altar in the earlier periods of the Christian church.[71] The earliest document of this practice from the Greek world is the famous description in Euripides' *Ion* (1141 f.). Here, a temporary tent structure for the festival was covered by a carpet richly embroidered with pictures of the stars. In Hellenistic time, the custom of using such heavenly carpets was so common that the actual term for canopies was *uraniscus*.[72] Their form was usually rectangular to conform to the shape of the structures. But an extremely interesting late gloss leads back into the oriental world and refers to circular awnings symbolizing heaven, such as we have already seen reflected in the Tomb of the Monkey (Fig. 2), and in the majority of later heavenly awnings in ceiling decoration: "*Heaven* . . . The Persians also [used the term] for the royal tents and courts whose round awnings they called Heavens."[73] In the Roman Imperial age the custom of decorating temporary awnings with heavenly representations is also documented. Nero used such a *velum* in the amphitheater: "The carpets which were spread out through the air, in order to protect [the spectators] from the sun, were of purple color, and in their center in embroidery Nero appeared driving a chariot, while around him golden stars spread their light."[74] Nero was represented here as the Sun-God in his chariot at the center of the starry heaven. We have already seen such quadrigas in various representations on ceilings or their reflections.[75] The ground color of heaven was a purple which Pliny,[76] speaking of the same performance, calls "the color of heaven." We may remind the reader of the use of red to symbolize heavenly light, which appeared on the canopy ceiling from Chiusi, in Aufudshi, in the Vatican mosaic (purple, Fig. 8) and in still later survivals.[77] The only direct representation of such a heavenly awning and one which gives evidence of the widespread and common popular use of such embroideries as early as the late Roman Republic, is the well-known relief with a funeral procession from Aquila (Fig. 23).[78] The whole surface of the awning, with the typical running spiral border, is covered with stars among which the crescent of the moon emerges.

This common use of the outspread awning, under the inspiration of illusionistic visions, led toward an enrichment of the canopy of heaven with imaginative patterns. The simple projection of the heavenly sphere on a circular disk, as we first find it in the tomb of Chiusi and, afterwards, in some of the monuments discussed in the first section, survives in many instances as a vague heavenly symbol. If one looks at the many Roman mosaic floors and the limited number of Hellenistic and pre-Hellenistic forerunners, one finds that the dominant central circle is not so common as one might suspect for reasons of pure decorative convenience. It remains rather exceptional. And in most cases, circular fields are filled with flying or heavenly figures which reflect their ultimate celestial symbolism. The same is true of the use of circular fields during and after the early Imperial period. On the other hand, simple circular centers decorated with ornaments or figural representations of heaven persist in the center of Christian vaults. The constant recurrence of painted central circles on catacomb ceilings is part of this development. A later Christian example in El Bagaonat (Fig. 24),[79] showing a cupola with the concentrically decorated round carpet, may illustrate the survival of the aboriginal type still found in several central disk-shaped decorations with starry patterns in various cupolas of San Marco in Venice.[80] We also saw this circle penetrated by representations of heavenly bodies, and interpreted as a sphere seen in space, in the Roman Imperial age (Figs. 5, 16). Those two elaborations as well as their mixture and superimposition define the character of many Christian monuments in an almost complete loss of the carpet motif.

But from an early period, we meet a different development which also continues in Christian art. This is based on the pseudo-illusionistic representation of a canopy spread out in the center of ceilings or of other supposed openings. In this variety, the points where the tent-like *velum* is fastened to the edges of the opening are marked by projecting angles between concave sides. We cannot define the exact moment when this innovation was made. But we do possess an isolated example of the representation of such a decoration in the apparently wooden cupola of a tholus on an Etruscan mirror of the third century B.C. (Fig. 26).[81] Again, we are led back to Etruria and its tradition in the

71. For these, see bibl., below, note 248.

72. K. F. Boetticher, *Tektonik der Hellenen*, 2nd ed., Berlin, 1874, I, pp. 259 f.; F. Studniczka, *Das Symposion des Ptolemaios IV*, Leipzig, 1915, pp. 27, 49 f.

73. Hesych., *s.v.* οὐρανός. Πέρσαι δὲ τὰς βασιλείους σκηνὰς καὶ αὐλὰς, ὧν τὰ καλύμματα κυκλοτερῆ οὐρανοὺς (ἐκάλουν).

74. Dio Cass., *Hist.*, LXIII, 2.

75. Compare Figs. 10, 14, 15. The motif of the sun-chariot already occurs in the carpet used by Ion for the ceiling of his tent; see above.

76. *Nat. Hist.*, XIX, 6, "Vela colore coeli stellata . . ."

77. P. 2 and note 8, and for red carpets over the compluvia of Roman houses, Ovid, *Met.*, X, 595; Chapot, *loc. cit.*

78. Photo Deutsches archaeol. Inst. Rom., neg. 1930, 516. See R. Pagenstecher, *loc. cit.*; E. Strong, *Apotheosis and After-life*, London, 1915, pp. 175 f., pl. 23.

79. W. de Bock, *Matériaux pour servir à l'archéologie de l'Égypte chrétienne*, St. Petersburg, 1901, pl. 15; W. de Grueneisen, *op. cit.*, pl. 21.

80. Gayet, *op. cit.*, I, pls. 22, 23 D.

81. E. Gerhard, *Etruskische Spiegel*, IV, Berlin, 1867, p. 106, pl. 355; M. Bratschkova, *Bull. Inst. arch. Bulgare*, XXI, 1938,

further development of a motif whose simple prototype first occurred there. It is a fully developed and constant feature in the age of Nero, the period of the fourth Pompeian style, and it agrees with the playful and pseudo-illusionistic tendencies of that style. In most cases, the supposed form of the canopy is circular and it appears with eight projecting angles between concave sides.[82] A recently discovered ceiling from Pompeii (Fig. 25)[83] illustrates the idea extremely well. As if it were a large carpet, the central square is supported by diagonal "candelabra" in which we find the familiar Sirens. In the outer centers of the four sides appear "tabernacles" covered by *uranisci*. Within this framework, an inner square is illusionistically opened. In its corners, four snake-bodied "Giants" support a flowery ring. Birds are perched on this ring to indicate the airy space of the vision, and at eight points the projecting corners of a windblown canopy are fastened. This canopy is embroidered with a divine group of two enamored planets: Mars and Venus. We possess a precious record in old drawings of a cupola decoration (Fig. 27)[84] from the Golden House of Nero (or the nearby Thermae of Titus), where the eight-cornered carpet occurs. Here, the awning is richly embroidered with alternating figural scenes and, at the projecting points, "grottesque" panels with supporting figurines appear; but they have been transferred into the surface of the canopy. The central circle shows Jupiter on clouds. The motif of the eight-cornered canopy occurs in pagan tombs of the later Roman period as well as in the Christian catacombs. It still survives in one of the central ornaments of the mosaic cupolas from San Marco.[85] But as early as the Flavian period we also meet an increasing number of projecting points and concave sides.[86] In another vault from the Golden House there is a twelve-cornered carpet which has a vision of Bacchus in the central disk. In an outer dodecagonal border we see alternating support-elements of a floral character no longer related to the corners, and figured scenes (Fig. 28).[87] The latter show hanging canopies seen in profile over the figures, a motif which illustrates the artist's consciousness of the meaning of the canopy. This is particularly interesting, because a later and fuller development of such radially independent canopies is found in the cupola decoration of San Giovanni in Fonte in Naples,[88] where rich canopies hang down over the biblical scenes in the radial fields around the blue central circle of heaven. In the circle the monogram of Christ has displaced the pagan divinities (Fig. 30). In a ceiling from Hadrian's Villa (Fig. 29),[89] we even find sixteen projecting corners and a pleasant decorative embroidery in corresponding radiating fields surrounding a central vision of Hercules and Bacchus. It is against this background that we can understand the fan-like patterns in various pagan and Christian monuments which we have discussed before (Figs. 5, 18, 19, 20).

Grandiose later domes were conditioned by this tradition. The cupola decoration of Santa Costanza (Fig. 31),[90] with its mixture of Christian and Bacchic elements, illustrates the passing of this type of decoration into the mediaeval world. The canopy of heaven with twelve projecting corners is spread out in the dome over an illusionistic picture of the earth and sea. The corners are fastened to caryatids who also support an upper row of similar figures and these in turn carry a second twelve-cornered awning in a central disk. The mixture of supports on and below the awning and the duplication of awnings and supporting figures recall the system of the ceiling from Pompeii (Fig. 25); the application of pictured panels to the radial sections of the canopy, and the twelve rays remind us of the ceilings from the Golden House (Figs. 27, 28). Finally,

p. 23, fig. 9, p. 122, no. 885. The artist clearly intended to represent the interior of a building with columns supporting a dome. Sections of the walls are visible at the two sides. See below, p. 20, note 176. What Gerhard interpreted as triglyphs are the ends of beams which support the flat ceiling over the ambulatory. The roof which is not seen in the picture would presumably be conical.

82. Examples, aside from those mentioned above in the text: Pompeii, Stabian Baths (alternating with circular fields), Ronczewski, *op. cit.*, pl. 25; Pompeii, arch of tomb, *ibid.*, p. 32, fig. 19; Palatine, A. Cameron, *The Baths of the Romans*, London, 1782, pl. 58; Golden House, *ibid.*, pl. 64, Ponce, *Description des bains de Titus*, Paris, 1786, pl. 57; Tomb of Hermes, above, note 59; our Figs. 5, 25, 27, 35, 54, 62. Six corners, Tomb of the Pancratii, *Memoirs Am. Ac. Rome*, IV, 1924, pls. 25 f., San Sebastiano, *ibid.*, pls. 28 f. Interestingly enough, one such ceiling of the early 2nd century A.D. is known from Alexandria: Pagenstecher, *op. cit.*, pp. 193 f., fig. 112. The more reduced square with only four corners is rare: *Pap. Brit. Sch. Rome*, VII, 1914, pl. 16, p. 32, n. 15, our Fig. 42; Golden House (oblong, with only two concave edges), Ponce, *Description*, pls. 18, 24. A somewhat hybrid adaptation also occurs in the Golden House (Cameron, *op. cit.*, pl. 62) and later in the Tomb of the Nasonii (above, note 62). The motif is confounded with the similarly edged aegis in the mosaic floor. Nogara, *op. cit.*, pl. 15 (2nd cent. A.D.).

83. *Not. sc.*, 1934, p. 329, pl. 12.

84. Bartoli, Appendix to *Picturae antiquae*, Rome, 1791, pl. 6; Cameron, *op. cit.*, pl. 59; Ronczewski, *op. cit.*, p. 35, fig. 22; A. B. Cook, *Zeus*, III, Cambridge, 1940, p. 39, pl. 5.

85. Demus, *op. cit.*, fig. 28; Gayet, *op. cit.*, I, pl. 23. See also T. Ebersolt, *Mon. Piot*, XIII, 1906, pl. 57.

86. Whether the strange rayed symbol (of the sun?) on the stucco ceiling of the house near the Villa Farnesina (Ronczewski, *op. cit.*, pls. 10, 11; E. L. Wadsworth, *Mem. Am. Ac. Rome*, IV, 1924, pp. 23 f.) has any connection with this type, I cannot say. Heavenly elements evidently form the main subject of this ceiling too: E. Petersen, *Röm. Mitt.*, X, 1895, p. 67; Ronczewski, *op. cit.*, p. 27. J. Lessing and A. Mau, *Wand- und Deckenschmuck eines römischen Hauses*, Berlin, 1891, pls. 13 f.

87. Bartoli, Appendix, *op. cit.*, pl. 2; Cameron, *op. cit.*, pl. 65; Ronczewski, *op. cit.*, p. 12, fig. 8. Similar: Cameron, *op. cit.*, pl. 60.

88. Wilpert, *op. cit.*, pls. 29 f. A similar motif in a catacomb painting of the 4th century, *idem*, *Roma sotterranea*, Rome, 1903, pl. 210.

89. Ponce, *op. cit.*, 1786, pl. 2; Gusman, *op. cit.*, p. 236, fig. 352.

90. Morey, *op. cit.*, pp. 142 f., with bibl.

FIG. 28. Rome, Domus Aurea: Stuccoed Vault

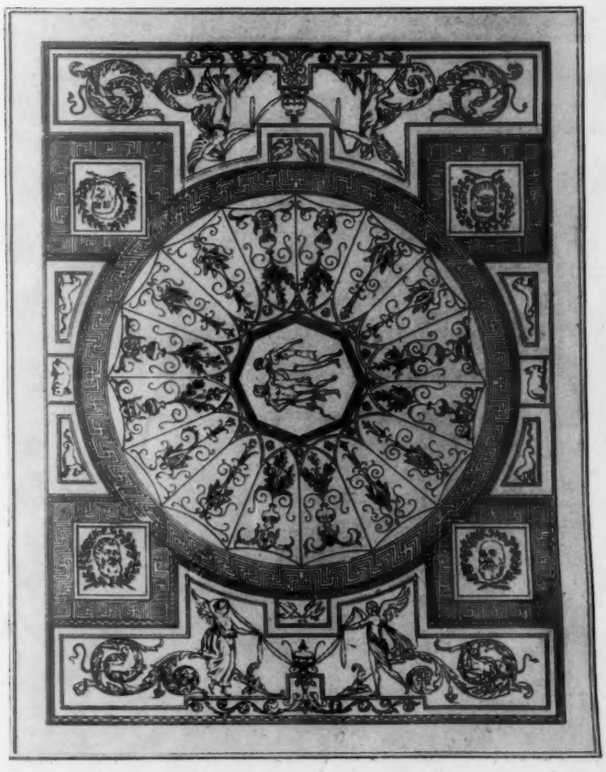

FIG. 29. Tivoli, Hadrian's Villa: Ceiling Decoration (Ponce)

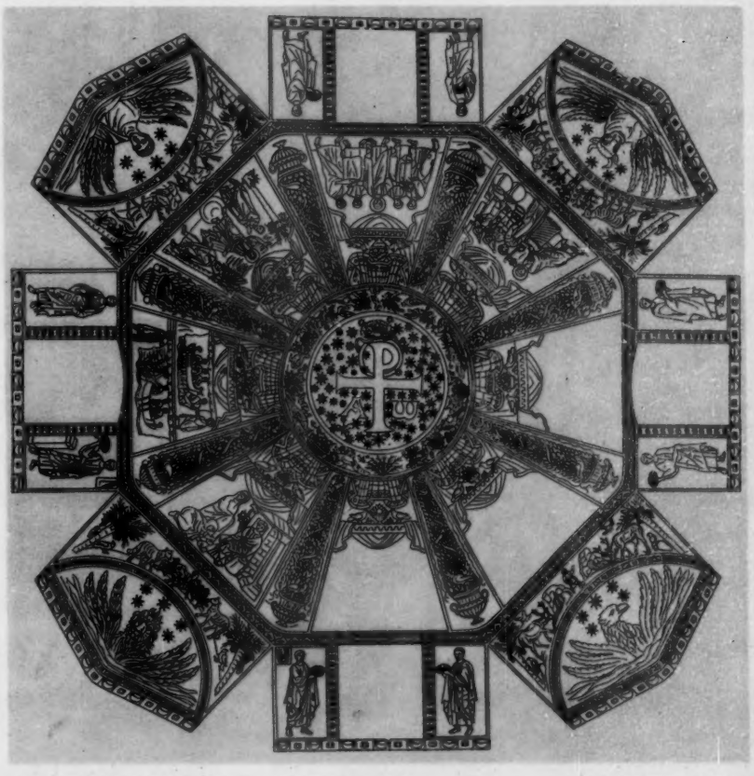

FIG. 30. Naples, San Giovanni in Fonte: Dome

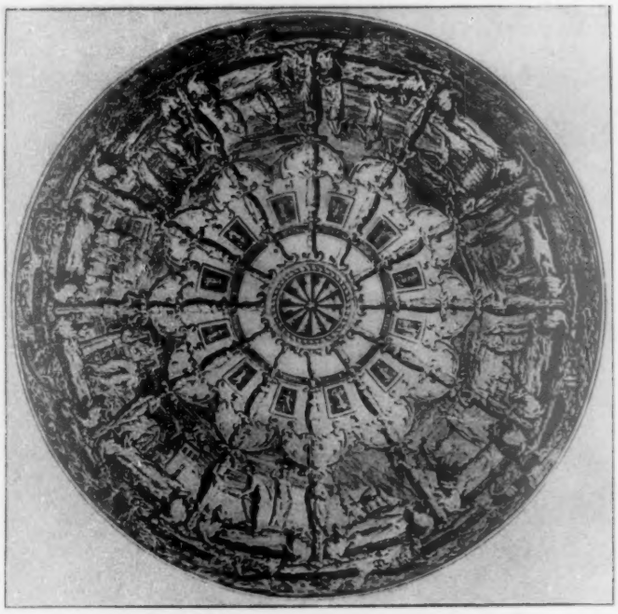

FIG. 31. Rome, Santa Costanza: Decoration of Dome

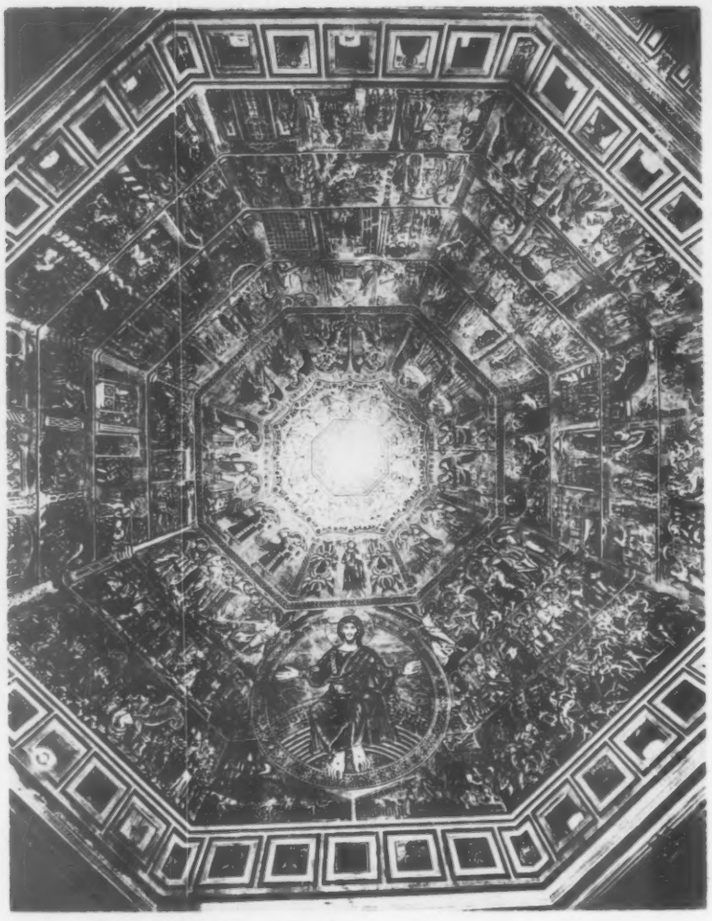

FIG. 32. Florence, Baptistery: Cupola

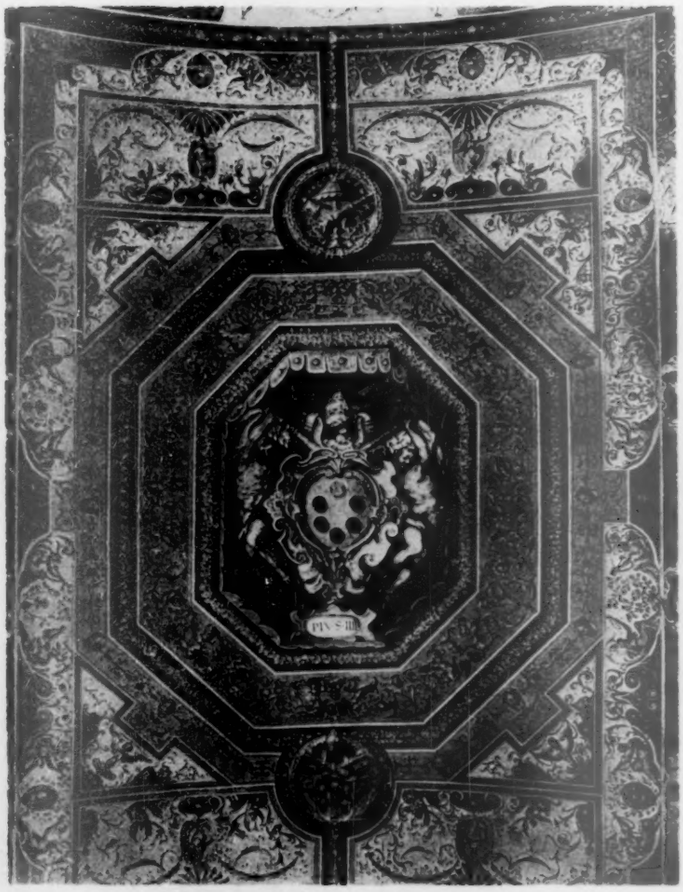

FIG. 33. Rome, Vatican: Vault of Sala Ducale

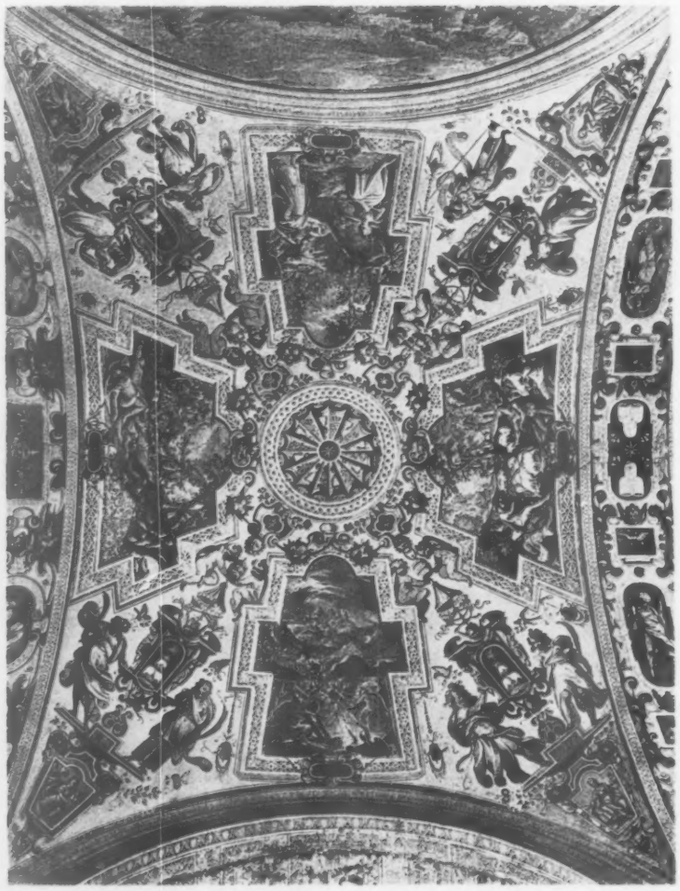

FIG. 34. Rome, Lateran Palace: Vault

there is a much later and equally important instance, at the end of the mediaeval period, in the dome of the Baptistery at Florence (Fig. 32).[91] Although the simple circle of heaven with radial fields is supported in the Tribuna by kneeling figures (Fig. 41), in the center of the main dome a richly embroidered golden carpet appears. It has sixteen projecting edges and the concave sides of the now familiar Roman type. Whether this is the result of direct and unbroken tradition or a symptom of a proto-Renaissance revival, I cannot say. But later, when the Renaissance artists elaborated the theme on the basis of a new direct approach to nature, they were still fully aware of the original meaning of a motif which by that time seemed to have become an abstract decorative formula of crystallized ornamentation. A good example is the ceiling of the Sala Ducale in the Vatican (Fig. 33; 1559–1565),[92] where the canopy is suspended over a hexagonal opening beneath which angels carry the coat of arms of the ruling pope to heaven. The starry canopy in the vault-center occurs even later still, as in a Zuccheri ceiling of the Lateran (Fig. 34).[93] As often happens, these cases display the way in which the new and vital Renaissance approach to reality discontinued the true classical formal tradition, which had been retained in crystallized schemes from the Roman through the mediaeval ages.

We must return once more to the Roman form of the canopy of heaven in the center of vaults in order to appreciate a branch from this root which grew to considerable importance in Christian ecclesiastical mosaics. The stucco decoration in the apse of the caldarium in the thermae near the Forum in Pompeii (Fig. 35)[94] shows a semicircle above the circular window. In this semicircle we see an illusionistic opening with a canopy of the previously discussed type fastened to its edge. In the same period, in the mosaic decoration of a fountain in Herculaneum (Fig. 36),[95] we find a representation of an apse vault situated over a shrine filled with a richly embroidered half-canopy of our type. This transfer of the rounded canopy of heaven to apsidal niches in the reduced form of a half-canopy is logical. We have another extremely interesting document for this process in a painted apse decoration from the Golden House (Fig. 37).[96] Here, however, the richly embroidered canopy emerges from the waves. In its center it bears images of Venus Marina and two Amores. Looking closely at it one notices that the upper edge is bent forward like a shell. It obviously expresses the old idea of Venus emerging from the sea in a shell. The same theme appears with illusionistic rendering in the mosaic decoration of the same period on apsidal fountains in Pompeii.[97] But it is also evident that two originally different motifs, the shell and the embroidered canopy of heaven, once used to fill the semicircle of apses, have been formally and symbolically fused in the representation from the Golden House. The canopy is essential enough for us to call this type the canopy with a shell border.[98] The important thing is that from the Early Christian period on, this Roman type of apsidal canopy occurs in the apsidal decoration of Christian basilicas in both varieties, with or without shell elements at the edges. Owing to the basic derivation of the Early Christian–Byzantine mosaic decoration of the canopy of heaven from such ancient models, this element is distinct from the pure shell motif which frequently occurs in sculpture, and, less often, in mosaic representations of buildings.[99] For example, the canopy of the supreme heaven, hanging in the uppermost part of the apse, with the hand of God emerging through it, occurs in the apse mosaic of Old St. Peter's (Fig. 38).[100] In addition to the simple embroidered canopy, the canopy with shell edges derived from the type of the Venus canopy of the Domus Aurea is used, too, as in the thirteenth century in Santa Maria Maggiore (Fig. 39).[101]

From the fact that this symbol is represented throughout mediaeval art with clarity, suspended above the physical heaven and connected with the hand of God or the cross, we may conclude that the survivals of the full canopy motif in the center of vaults and domes, which otherwise might

91. E. W. Anthony, *A History of Mosaics*, Boston, 1935, pls. 61, 62; M. E. Isabelle, *Les édifices circulaires et les dômes*, Paris, 1855, pl. 52. For chronology see R. v. Marle, *The Development of the Italian Schools of Painting*, I, The Hague, 1923, pp. 265 f. (with incorrect description). For the motif, see also the center of the vault in Anagni: P. Toesca, *Affreschi decorativi in Italia*, Milan, 1917, pl. 22.

92. Colasanti, *op. cit.*, pl. 59.

93. *Ibid.*, pl. 101.

94. Ronczewski, *op. cit.*, pl. 26. This part of the decoration almost certainly belongs to a late fourth style restoration.

95. House of Mosaic Triclinium. Photo Alinari 43125.

96. Ponce, *Description*, pls. 7, 8. Photo Alinari 27097 shows the apse in its entirety with what is preserved of the painting. Compare also the quarter sections of such canopies in the lateral fields, above, Fig. 28. According to Mazois, *Les ruines de Pompéi*, III, Paris, 1836, pl. 48, fig. 3 (see Niccolini, *Case e monumenti di Pompei, III, Terme presso l'arco della Fortuna*, pl. 2), the niches of the frigidarium in the Forum Baths had similarly hybrid "shells" with embroidered sea monsters.

97. Herrmann and Bruckmann, *Denkmäler der Malerei des Altertums*, Text, I, Munich, 1904, p. 257, fig. 77; M. Bratschkova, *op. cit.*, pp. 11, 84, fig. 4.

98. For this fusion, see Bratschkova, *op. cit.*, pp. 30 f., 55, 81 f., with more examples and a full discussion of the later development.

99. See, for the material, *ibid.*, pp. 44 f., 70 f., 86 f. In the discussion these motifs have not been sufficiently distinguished.

100. Wilpert, *Mosaiken*, I, p. 362, fig. 114. For other examples of the simple canopy: Lateran, Baptistery (4th cent.), *ibid.*, pl. 1; Forum Claudium, É. Bertaux, *L'art dans l'Italie méridionale*, Paris, 1904, I, pl. 13; Santa Maria in Trastevere (12th cent.), A. Agazzi, *Il mosaico in Italia*, Milan, 1926, fig. 22.

101. Wilpert, *op. cit.*, I, pls. 121–122. For other examples of the canopy with shell edge: Ravenna, San Apollinare Nuovo, *ibid.*, pls. 100, 2; Santa Francesca Romana, Parenzo, Gayet, *op. cit.*, II, pl. 15; San Clemente, Wilpert, *op. cit.*, pls. 117 f. (with candelabra supports of the projections, cf. our Figs. 27, 29).

easily be interpreted as purely decorative elements, were also consciously used as symbols of the highest heaven.

III

Next in importance to the vision of the center of heaven in the decoration of Christian vaults and domes, however that vision is defined, are figures which surround, if they do not actually support, the heavenly representation or its central element. Usually they are four in number and arranged in a vertical or diagonal cross pattern. Our investigation started with a comparison between one such type, the Sirens, and its obvious continuation in the use and meaning of the symbols of the evangelists in corresponding places in Christian art. Typologically, of course, the actual appearance of the evangelists has other origins. Apart from the previous examples showing Sirens in antiquity as diagonal supporting elements of heaven or its canopy (Figs. 2, 3, 5), a few other instances of the kind[102] may be passed over here, together with the use of the symbols of the evangelists (Fig. 1) for a similar purpose in the four corners of a vault or around its central element, which occurs from the Early Christian period on.[103] But, in addition to the interesting inscription from San Marco in Venice which explains the evangelists as cosmic musicians, and thus as successors to the Sirens,[104] we have a precious document bearing upon this relationship. This is an Ottonian miniature in which, in a strange hierarchic combination of antique mythology and Scripture, four Sirens support the symbols of the evangelists around the representation of Christ in the Tree of Life (Fig. 40).[105]

102. (a) Pompeii, below, Fig. 54; (b) Domus Aurea: Cameron, *op. cit.*, pl. 60 (small Sirens perched on the picture panels of the center of each side and giving additional support to the central canopy); (c) ? Domus Aurea: on the diagonal supports of the central circle of the Volta Dorata, according to the less reliable reproduction by Minni (Ponce), *Jahrb. arch. Inst.*, XXVIII, 1913, p. 169, fig. 15; (d) Villa of Hadrian: Ponce, *op. cit.*, pl. 10 (in the diagonal foliated supports).

103. Examples: (a) Naples, San Giovanni in Fonte, Fig. 30; (b) Ravenna, Mausoleum of Galla Placidia: in corners of vault, best ill. *Boll. d'arte*, VIII, 1914, fig. 55, opp. p. 142, C. Ricci, *op. cit.*, 1, pl. 1A; (c) *ibid.*, Palace Chapel: between the corner supports, fig. 44; (d) Palermo, Martorana: A. Colasanti, *L'arte bisantina in Italia*, Milan, 1914, pl. 32 (in the squinches of the cupola), like a; (e) Windischmatrei: Fig. 51, supporting the central disk; (f) Pürgg: Fig. 52; (g) Civate: P. Toesca, *La pittura e la miniatura nella Lombardia*, Milan, 1912, pp. 107 f. (around a disk with the monogram of Christ). For evangelists supporting the celestial sphere in manuscripts, see W. Weisbach, *G.B.A.*, LXXXI, 1939, p. 136.

104. Above, p. 3.

105. Munich, Cod. Lat. 4454, G. Leidinger, *Miniaturen und Handschriften der Bayerischen Staatsbibliothek*, VI, Munich, n.d., pl. 13, pp. 27 f.; Weisbach, *op. cit.*, p. 140, fig. 5, p. 144. I see no reason to connect these Sirens with the rivers of Paradise. The poem mentioning them does not refer to other elements of the picture such as Sun, Moon, Oceanus, Caelus. Although it refers to the symbols of the evangelists and their association with those rivers, which is otherwise documented, it does not aim at interpreting all the details of the picture. For rivers of Paradise, see below, p. 18.

Closely related to the Siren type, though possibly of different meaning and connected with the motif of the winged Horae,[106] is the female divinity or demon emerging as a half figure or bust from a floral root. Whatever the original meaning of the motif and its various applications,[107] in the early Imperial age it was used in the decoration of heavenly vaults for corner supports. We have already met such figures in the cupola from the Golden House (Fig. 27), where they appear above the Giants within the radiating ornamentation of the canopy of heaven. In the same building they also appear with diagonal "Victories" in the outer corners of a vault of which the chief motif is a twelve-cornered canopy.[108] It is interesting to note that the use of such a figure as an actual "caryatid" occurs in Etruscan funeral art. I refer to one side of the central pillar of the Tomba del Tifone in Tarquinia which dates from the third century B.C. While the three other sides (Fig. 48) have ceiling supports of a different kind, the fourth shows a female figure terminating in foliage.[109] On the other hand, wingless "caryatids" emerging from chalices support the outer edge of the heavenly canopy in the cupola of Santa Costanza (Fig. 31) in the initial period of Christian monumental art. They are flanked by heraldic feline animals in continuation of the old type of the Lady of the Animals.[110] The second and upper row of supports of the supreme heaven in the center of the canopy is formed by images of triple Hecate,[111] the all-powerful divinity of earth and heaven in late antique speculation and superstition. In the light of our earlier observation,[112] it is not surprising to find a late echo of this type of floral winged half-figures,[113] in the crowning elements of "grottesque" candelabra supporting the periphery of the central disk of the Lamb in the Scarsella vault of the Baptistery in Florence (Fig. 41).[114] Other figures to be discussed later support the larger outer circle of this heavenly canopy.

Also intimately related to the figures emerging from chalices are the supports of heaven, sometimes winged, commonly known as "Victories." As early as the Golden

106. See below, pp. 15 f.

107. See E. Jastrow, *A.J.A.*, XLVI, 1942, p. 119.

108. Cameron, *op. cit.*, pl. 60; compare above, p. 12, note 87. Compare the similar position of such (unwinged) figures in a mosaic: *Inv. des mos., Gaule*, 301, and also, possibly, the supports of the central disk with Pegasos in the Tomb of the Nasonii: *Jahrb. arch. Inst.*, XXV, 1910, Beilage 2.

109. G. Dennis, *Cities and Cemeteries of Etruria Maritima*, 3rd ed., I, London, 1883, p. 448.

110. See above, note 107.

111. C. Cecchelli, *op. cit.*, p. 62.

112. Above, p. 13.

113. In this case, however, they seem to be male. The artist who designed these mosaics must have had a model, all the details of which he did not understand. This would account for the change of sex. The dependence on such a model is indicated by the strange position of the wings growing from the elbows.

114. Anthony, *op. cit.*, pl. 60.

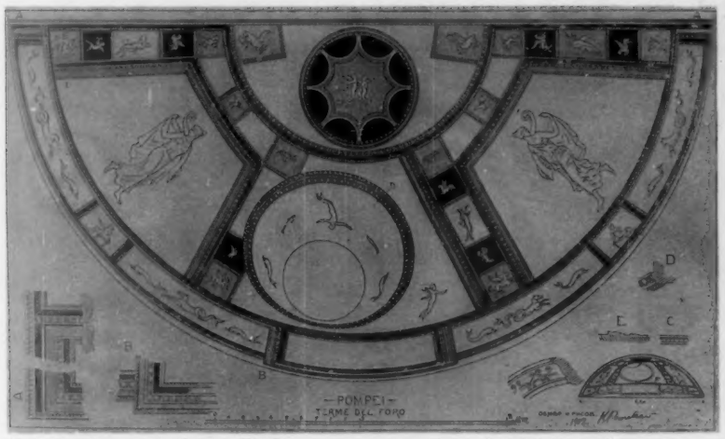

FIG. 35. Pompeii, Forum Baths: Stucco Decoration of Caldarium Apse

FIG. 36. Herculaneum: Mosaic Decoration of a Fountain

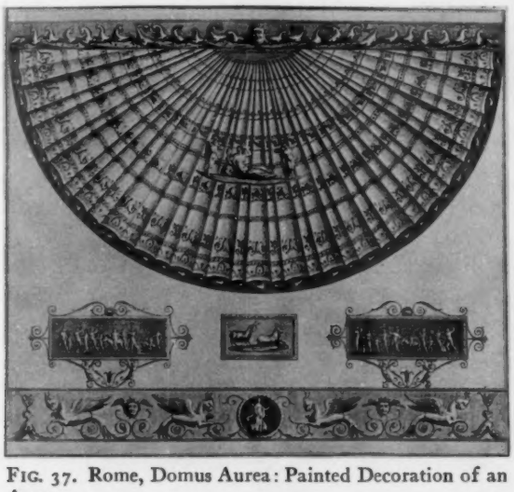

FIG. 37. Rome, Domus Aurea: Painted Decoration of an Apse

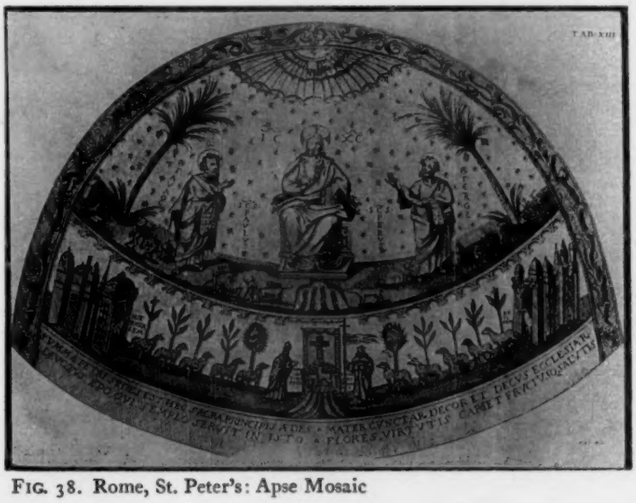

FIG. 38. Rome, St. Peter's: Apse Mosaic

FIG. 39. Rome, Santa Maria Maggiore: Apse Mosaic

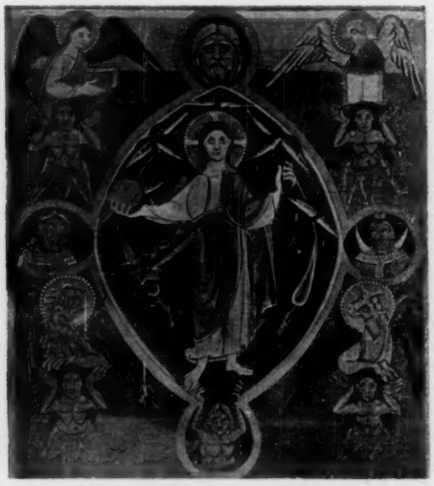

FIG. 40. Munich, Staatsbib.: Cod. Lat. 4454 p., Sirens Supporting the Symbols of the Evangelists

FIG. 41. Florence, Baptistery: Vault of the Scarsella

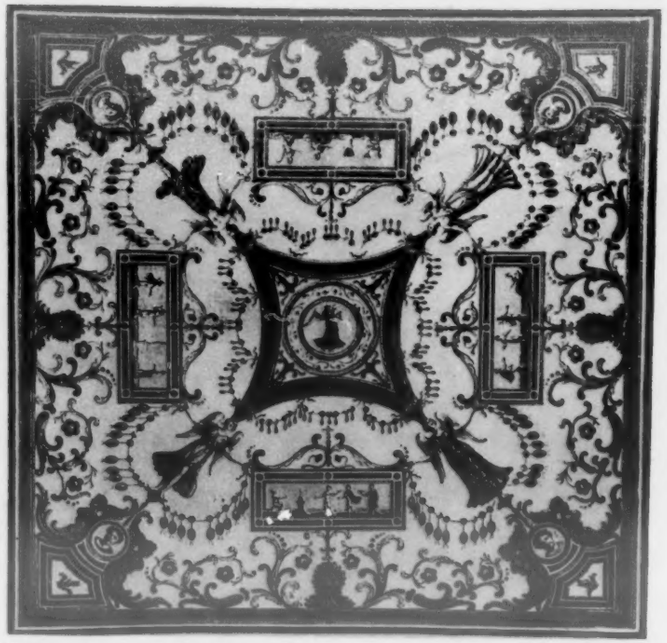

FIG. 42. Rome: Painted Vault (from an Old Drawing)

FIG. 43. Ostia, Terme dei Magazzini Republicani: Mosaic Floor

House of Nero[115] such draped winged female figures appear in the traditional position of diagonal supports of the canopy of heaven. In a lost vault, possibly from the same place, and preserved in old drawings (Fig. 42),[116] we find these figures hovering over disks containing the busts of the four Seasons and supporting the corners of a canopy. Such figures occur again in the well-known stucco ceiling from the Via Latina of the second century A.D.[117] It is evident that these supporting figures on ceilings are the forerunners of the angels occurring in similar positions and having a similar function and meaning in the decoration of Christian vaults and cupolas, whether they are simply winged demons (Fig. 44)[118] or the orientalized type of Seraphim.[119] Although the angels in the vault of the Archbishop's Chapel in Ravenna stand solidly on green mountains, they hover on globes in the vault of the presbytery of San Vitale (Fig. 45)[120] in Torcello,[121] and in Santa Prassede in Rome.[122] We have already met this type of the "Victory" on a globe in the same position and function in a vault from Hadrian's Villa (Fig. 10) and we commented upon a curious detail of that representation: the different size of the globes representing different phases of the annual cycle.[123] It is an amazing document of the continuity of both form and spirit between Roman Imperial and Byzantine art that a similar indication of cyclic changes recurs in the vault of San Vitale (Fig. 45). As good reproductions clearly reveal, the globes are distinguished in each case by larger and smaller areas of light representing various astronomical phases, a convention which occurs elsewhere in Byzantine art.[124] Thus the master of the San Vitale mosaic, while imbuing the pagan type with a Christian meaning, retained the pagan connotation of the changing cycle of time. The coördination of Christianized winged demons, called angels, with the various energies of nature and the elements occurs in the same period in the cupola decoration described by John of Gaza (Fig. 63), and it is also documented by literary evidence.[125] These associations are further borne out by the motif — unique among ancient ceilings — of the "Victories" blowing trumpets in Hadrian's Villa (Fig. 10). Angelic trumpeters occur much later in a vault in Civate[126] and the "*evangelicae quattuor tubae*" have left their traces in Carolingian art.[127] It is evident that this is another Christian element derived from ancient decorative symbolism. What was the original meaning of the heavenly winged musicians who hover on globes and support the higher regions of the universe, over which Jupiter rules as Pantokrator? If their musical activity relates them to the Sirens, their global supports emphasize cosmic service, and the changing phases of these spheres indicate their relationship to the phases of the year. Who are they and who are all their winged sisters on ceilings? Are they figures symbolizing time, like the winged Horae, the hours which are described as preceding and succeeding dawn in John of Gaza's cupola (Fig. 63)? We were also tempted to recognize such personifications in the wingless girls who dance around the images of planetary gods in another ceiling from Hadrian's Villa (Fig. 5).[128]

115. Cameron, *op. cit.*, pl. 60 (over winged busts emerging from chalices, above, note 108, and between Sirens, above, note 102). A lost Roman ceiling from a tomb in Alexandria should possibly be included too: R. Pagenstecher, *op. cit.*, pp. 181 f.

116. *Pap. Brit. Sch. Rome*, VII, 1914, pl. 16, p. 32, no. 15.

117. Wadsworth, *op. cit.*, pls. 25 f. Here in each case six of them support the lateral carpets which are decorated with mythological scenes and grouped around a central field with a canopy with a celestial picture. In the outer corners of the entire cross-vault allegories of the four seasons appear.

118. Ravenna, Archbishop's Chapel: Wilpert, *Mosaiken*, pl. 91; Galassi, *op. cit.*, pl. 64; Ricci, *Monumenti*, V, pl. 41; Morey, *op. cit.*, fig. 169, p. 276. *Ibid.*, and p. 29, Professor Morey connects these angels with the Victories holding *clipei* over their heads from the well-known tomb in Palmyra and from Dura (not an oriental, but a common Roman type: see F. Staehelin, *Die Schweiz in römischer Zeit*, 2nd ed., Basel, 1931, p. 212, fig. 46). This type is, of course, related in a general way. However, the use of four such supports in Christian vaults is undoubtedly directly derived from similar Roman ceilings. Other examples in the pendentives of the Pentecost cupola in Venice, below, Fig. 68, and flying, in the central dome there: Demus, *op. cit.*, fig. 12. This type occurs in reduced form in the cupola of the Martorana in Palermo, above, note 103. Kneeling angels supporting the disk with the bust of Christ between corner medallions with the symbols of the evangelists: M. Nugent, *Affreschi del trecento nella Cripta di S. Francesco ad Posina*, Bergamo, 1933, pls. 90 f. At least one such angel supporting a sphere (according to Friedländer's reconstruction, *op. cit.*, pp. 195 f., which, in this part, seems to me to be preferable to that of Krahmer) occurred in the cupola decoration described by John of Gaza. Again, the chorus of angels in the arcades over which the awning of the cupola of the Baptistery in Florence (Fig. 32) is suspended is derived from this old tradition. See also for the motif: J. Ebersolt, *Mon. Piot*, XIII, 1906, p. 38, fig. 3, note 1, pls. 26–27; Anagni: P. Toesca, *op. cit.*, pl. 22.

119. Constantinople, Hag. Sophia, pendentives of the dome; Kiew, vault of Hag. Sophia; Venice, San Marco, cupola of the Creation.

120. For the best illustrations in which the above mentioned detail can be distinguished: Galassi, *op. cit.*, pls. 73 f. Compare also A. Blanchet, *La mosaïque*, Paris, 1928, pl. 13. For restorations: C. Ricci, *op. cit.*, VI, 1935, pl. 46. Two of the spheres are preserved in their original state and show the difference in the lighted areas. The two others (those at the sides of the Lamb) are antique restorations. Two of the corner globes are also preserved in the original state. A third one is partly ancient, partly restored in antiquity. Only one is modern. This is sufficient to show that the differentiation belongs to the original state.

121. Galassi, *op. cit.*, pl. 115; A. Agazzi, *Il mosaico in Italia*, Milan, 1926, fig. 4.

122. A. Colasanti, *L'arte bisantina in Italia*, Milan, 1912, pl. 95.

123. Above, p. 7, note 41.

124. Compare the *Creation of the Firmament* in Monreale: D. Gravina, *Il duomo di Monreale*, Palermo, 1859, pl. 15 C.

125. G. Krahmer, *op. cit.*, p. 4.

126. R. v. Marle, *op. cit.*, I, p. 224.

127. Weisbach, *op. cit.*, pp. 131 f., 136.

128. See above, pp. 3, 7. Dancers on pedestals occur between the supporting diagonal Sirens (above, note 102) in another vault from Hadrian's Villa (Ponce, *op. cit.*, pl. 10), in which the central carpet shows the four seated Seasons around a rosette.

However this may be, the occurrence of the four Seasons as actual supports of heaven or alluding to that function by their position in heavenly ceilings is well substantiated. Their types are various and they are also connected in various ways with other spheres of art. We have already met them as standing full figures in a ceiling from Hadrian's Villa (Fig. 5), where they appear in mandorlas on the canopy of heaven around the central field in which the starry globe is visible. They occur in diagonal positions in several other Roman vaults and in their reflections on mosaic floors.[129] Under the circumstances, the question arises whether the four diagonal heavenly women supporting the planisphere of the Dendera ceiling (Fig. 7) are simply Egyptianized Seasons, too. Like the planets the Seasons are occasionally represented as seated figures in a ceiling from Hadrian's Villa.[130] They were seen thus seated, though as a compact group in the Byzantine cupola described by John of Gaza (Fig. 63).[131] Their appearance as busts in the corners of ceilings is more common (Fig. 42).[132] It may be noted that the connection of this type of corner bust with systematic representations of heaven is documented by late survivals in manuscripts, where a planisphere is surrounded by four corner busts of Seasons.[133]

In view of the many other connections, it is notable that this naturalistic element of the annual cycle of the year, with its relationship to the world of experience, was eliminated from monumental Christian vaults and domes. As far as I know, there exists but one early survival, in the hidden allusion to seasonal changes in the composition of the crown surrounding the divine Lamb in the center of the vault of the Lateran Chapel (Fig. 46).[134] This crown is composed of four different sections (each with its center in the diagonal) whose elements reflect the flora of the four seasons. On the other hand, the ceiling is interesting in comparison with a Roman mosaic floor of the second century A.D. which may well reflect the decoration of a pagan vault (Fig. 47).[135] This mosaic shows Diana Ephesia as celestial Pantokrator in a crown "of life" with the eagle of Jupiter hovering over her head. The differentiation of the four diagonal corner trees as sprouting, fully developed, wind-swept, and barren, evidently symbolizes the seasonal changes of the eternally moving cosmos.[136] In a vault at San Prisco in Capua these trees were supplanted by the eternal palm trees of Paradise.[137] In other ways also, as in the well-known general symbolism of floral elements, Christian art reflects the idea of permanent and eternal life. The vault of the Lateran Chapel is a good example of the Christian elaboration of this theme; it adapts the floral diagonal corner supports of the canopy of heaven to this new meaning. The use of these floral motifs in ancient ceilings as well as in Christian vaults is so common and so widespread, and their association with heavenly ideas is so evident from the examples offered in our illustrations, that a further discussion of other instances is not necessary.

Returning to the varieties of supporting figures in ancient ceilings, we notice with some surprise the absence of the normal forms of standing female caryatids or male telamones as supports of heaven.[138] The telamones occur but once, at Ostia, in a third century A.D. mosaic floor (Fig. 43) which seems to reflect a ceiling decoration.[139] This connection is indicated by the capitals on which the diagonal supporting figures stand. Such capitals occur again a thousand years later, beneath supporting figures in the decoration of the vault of the Scarsella in the Baptistery in Florence (Fig. 41) which preserves so many remnants of antique tradition. On the other hand, the central motif of the city wall sustained by these telamones — whatever its meaning here[140] — appears to be a forerunner of Christian repre-

129. Ceilings: Palatine, Cameron, *op. cit.*, pl. 57; Via Latina, above, note 117. Mosaic floors: La Chebla, *Inv. des mos., Tunisie*, 86; Hippone, Fig. 18.

130. Ponce, *op. cit.*, pl. 10, see above, note 128. Four seated Seasons occur in the outer spandrels of the calendar mosaic from Carthage, see above, note 50.

131. G. M. Hanfmann, *loc. cit.*

132. Other examples: (a) Golden House, in the spandrels of an inner carpet with the representation of Hercules and Bacchus: Cameron, *op. cit.*, pl. 62; above, note 82; (b) Tomb, 2nd cent. A.D.: Bartoli, *Pitture*, pl. 14, with interesting connections: the central circle is characterized as the opening of a dome from which four diagonal crowns are suspended and the edge of which has preserved a remnant of the fringed outline (above, p. 9, note 62); (c) Ostia, tomb: G. Calza, *Necropoli*, pl. 1, figs. 66 f. Although most of the other pagan elaborations are absent in the catacomb ceilings, this less conspicuous element has been retained in some of them: for example, Wilpert, *Roma sotterranea*, pl. 100. — Reflections on mosaic floors: Calendar mosaic from Antioch, Fig. 13; Phaeton mosaic, *Mon. Piot*, XXI, 1913, pl. 9.

133. Boll, *Sternglaube*, pl. 8, fig. 15. It may also be recalled at this point that masks of the four winds occasionally fulfill a similar function on ceilings: (a) Pompeii, Ronczewski, *Gewölbeschmuck*, pl. 29; (b) Hadrian's Villa, Fig. 29; (c) Tomb of Via Latina, above, notes 117, 129 (in the corners of the central field). This type, too, recurs in astronomical illustration, this time in the famous Bianchini marble planisphere: Boll, *op. cit.*, pl. 15, fig. 28.

134. Wilpert, *Mosaiken*, pls. 86 f.

135. Blake, *Mem. Am. Ac. Rome*, XIII, 1936, pl. 41, fig. 4.

136. Another reflection of a celestial ceiling with a star in the center of the round canopy and diagonal corner-trees occurs in a mosaic floor from Gaul: *Inv. des mos., Gaule*, 291.

137. C. Cecchelli, *Architettura*, p. 55.

138. Vitruvius, *De arch.*, VI, 7, 6.

139. The mosaic is found in a thermal hall of the so-called "magazzini republicani": described by G. Calza, *Ostia, Guida*, Milan, n.d., pp. 88 f.; *idem*, 2nd ed., pp. 91 f., fig. 29. Illustrated: *idem, The Excavations at Ostia*, Milan, n.d., fig. 4; *idem, Ostia (Itinerari dei musei)*, Rome, n.d., p. 19, fig. 5. For the date (2nd half of 3rd cent. A.D.), see H. Bloch, "Bolli laterizi," *Bull. com.*, LXVI, 1938, p. 279.

140. The motif of the city wall in mosaic floors has its own long history: R. Herbig, *Germania*, 1925, pp. 138 f.; M. Blake, *Mem. Am. Ac. Rome*, VIII, 1930, pp. 73 f., 106; *ibid.*, XIII, 1936, p. 189. In this case, however, the floor reflects a vertical succession

FIG. 44. Ravenna, Archbishop's Palace: Vault of Chapel

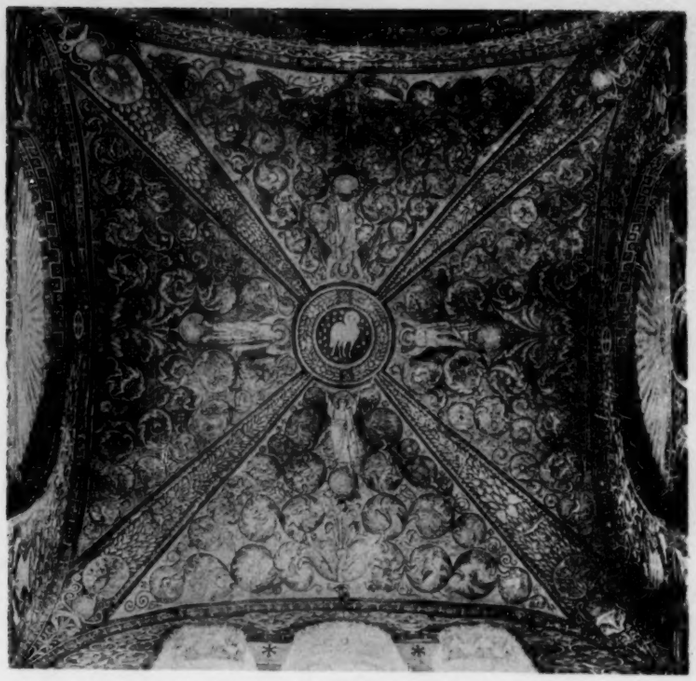

FIG. 45. Ravenna, San Vitale: Vault of Presbyterium

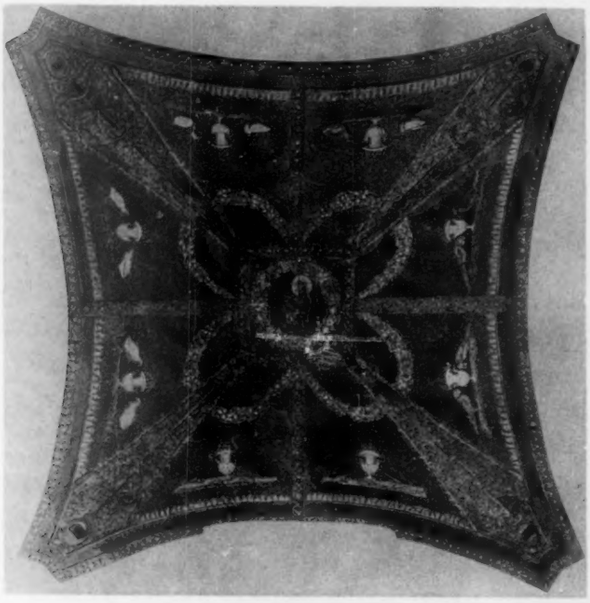

FIG. 46. Rome, San Giovanni in Laterano: Vault of Chapel

FIG. 47. Rome, Quirinal: Mosaic Floor

FIG. 48. Tarquinia, Tomba del Tifone: Central Pillar

FIG. 49. Algeria: Mosaic Floor

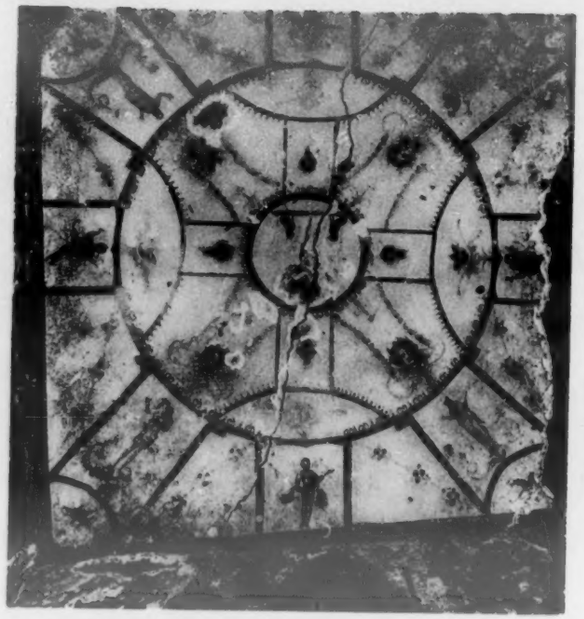

FIG. 50. Rome, Catacomb of Lucina: Ceiling

FIG. 51. Windischmatrei, Church: Section of Vault

FIG. 52. Pürgg, Church of St. John: Vault

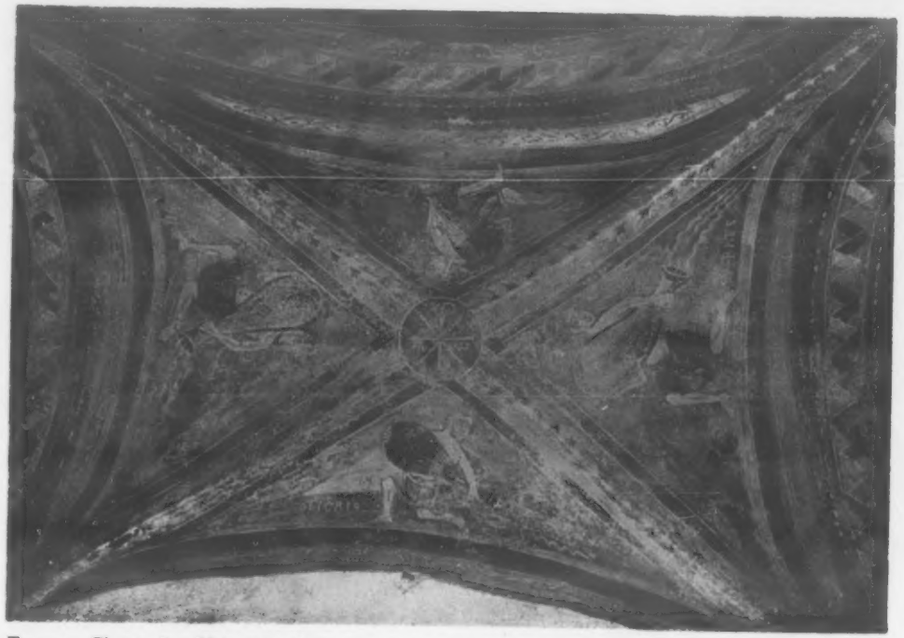

FIG. 53. Civate, San Pietro: Vault

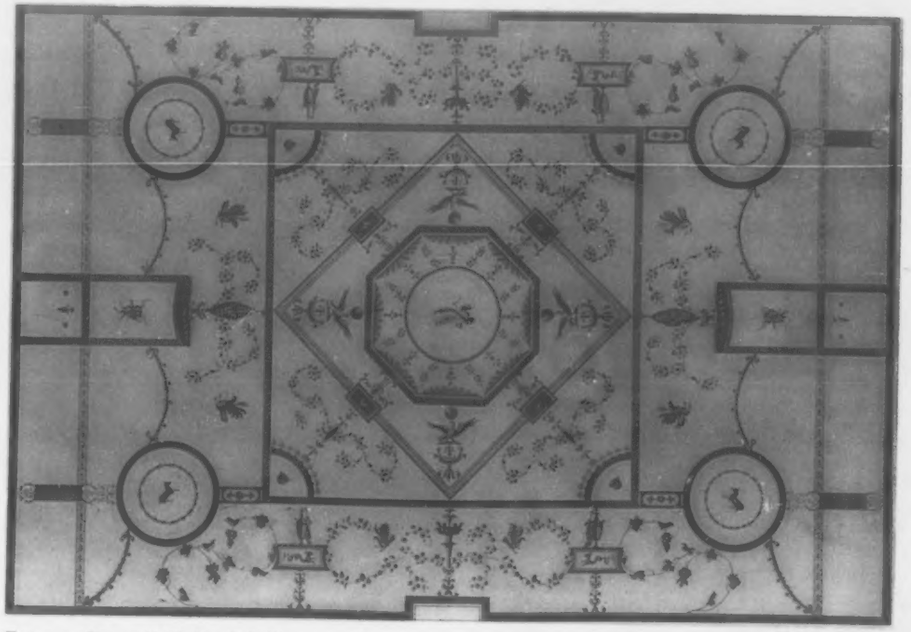

FIG. 54. Pompeii: Painted Ceiling

sentations of the heavenly city in vaults (e.g., Fig. 51). Atlas supporting the heavenly globe, a not uncommon theme of ancient art, does not occur: the individual effort of this purely mythological figure could not easily be included in the speculative and decorative system of these ceilings.[141] Only later do we meet Atlas, in the strange and descriptively organized decoration of the cupola in Gaza (Fig. 63). Here he is aided by two intellectual personifications of Virtue and Wisdom, and he is relieved of his original universal function and carries only the sun. Instead of traditional telamones, we find unorthodox supporting males such as the herms of Pan, in two ceilings from the Villa of Hadrian (Figs. 5, 10). They allude to the power of the elementary god of nature and his alleged universality.[142] Brute element that he was, he could not, of course, be christianized. The same is true of the diagonal youthful dancers whom we met in the mosaic in the Vatican (Fig. 8; compare also Fig. 5) and whose meaning escapes us so far,[143] though there are counterparts to them in a ceiling from Pompeii.[144] A third type, evidently of common use and old tradition, which again leads back to Etruscan funeral art, is that of the demon whose body terminates in two snakes. On the central pillar of the Tomba del Tifone (Fig. 48) of the third century B.C.,[145] winged underworld demons of terrible aspect support the ceiling with raised arms. These underworld monsters as such could not find their way into heavenly representations; neither could their cousin, the Etrusco-Roman god Summanus, whose images showed the same monstrous type.[146] The snake monster which appears as a diagonal corner support in several ceilings is rather to be identified with the Giants of Greek mythology whose iconography, undoubtedly, also inspired those other creatures. The idea of an earthbound anchor of the heavenly structure is expressed by the insertion of such figures in the diagonal candelabra of one of the vaults from Hadrian's Villa (Fig. 5), while in the cupola decoration from the Golden House, such giants occur in radiating elements of the canopy, which higher up, include the floral goddess (Fig. 27). In a third ceiling, this time from a tomb in Rome,[147] each of the outer corners of a canopy is filled with a diagonal heraldic group of two such monsters with entwined snake bodies, and again they are winged. In the Pompeii ceiling reproduced in Figure 25, the four columns supporting the central ring to which the canopy is fastened are stylized architectural forms based on this type. An interesting reflection of this genre is found in a funeral mosaic from Algeria (Fig. 49),[148] in which four diagonal giants support the heavenly circle containing an allegory of the release of the soul by the divine physician. J. Carcopino has commented on the relationship of such demons to the spheres of the planets and the stars and to such acolytes of heaven as the Cherubim.[149]

All these male demons who were not susceptible of Christian reinterpretation were, it seems, eliminated by Early Christian art. In the catacomb ceilings, the traditional diagonal corner spaces of supporting elements are commonly occupied by figures of orantes who, with their raised arms and frontal position, naturally offered themselves as the successors to the antique figures (Fig. 50).[150] But some tradition must have survived in monumental art,[151] because we have two strange late reflections of it in thirteenth-century vaults from Austria. In the church of Windischmatrei in the Tyrol (Fig. 51), the central disk with the image of Christ is supported by the four symbols

from the edge toward the center: marine divinities and swimmers form the outer frieze; chariots on land follow; the city supported by figures over columns is clearly in the air. I have no explanation to offer.

141. See, however, below, note 207.

142. It is this connection with the universe, of course, and not a purely "poetical" reason which motivated his presence in the mechanical clock described by Procopius of Gaza: H. Diels, *Abhandl. Akad. Berl., Phil.-hist. kl.*, 1917, p. 15.

143. See below, p. 18, note 153.

144. Ronczewski, *op. cit.*, pl. 29 (diagonally placed in the four corners to which the central canopy is fastened by candelabra). A mosaic from a tomb of the 2nd cent. A.D. (Bartoli, *Sepolcri*, Rome, 1765, pl. 18) shows four dancers with flutes, two of them wearing pointed caps, moving in acanthus foliage around a central motif which looks as if it had included a globe which Bartoli misunderstood: compare, for this mosaic, H. Goldman, *A.J.A.*, XLVII, 1943, p. 28.

145. E. Q. Giglioli, *L'arte etrusca*, Milan, 1935, pls. 388, fig. 4, 389, figs. 1–2, p. 72, with bibl. For the fourth side, see above, p. 14.

146. L. Curtius, *Röm. Mitt.*, XLIX, 1934, pp. 233 f.

147. Reproduced from Bartoli in Ronczewski, *op. cit.*, p. 38, fig. 24.

148. *Musée d'Alger* (*Description de l'Afrique du Nord*, 21), Paris, 1928, pp. 83 f., pl. 13, fig. 2. Compare also the diagonal supporting giants in a slightly earlier mosaic floor from Great Britain, whose pattern is intimately related to ceiling decorations although its representations are of different character: Ph. Morgan, *Romano-British Mosaic Pavements*, London, 1886, pl. opp. p. 136.

149. *Rev. arch.*, I, 1922, p. 263, note 2.

150. Examples: Wilpert, *Roma sotterranea*, pls. 61, no. 1, 72, 75, 96, 203, 210.

151. In the oratorium of Santa Croce (5th cent. A.D.), four wingless young men supported the central disk with a cross according to Sangallo's drawing: Cecchelli, *op. cit.*, p. 51. A Florentine miniature, to which Richard Offner has kindly called my attention, shows a central Kosmokrator with the sun and moon in a circle from which the four major winds radiate, while twelve minor winds are seen in the spandrel-like corners: P. d'Ancona, *La miniatura fiorentina*, Florence, 1914, I, p. 5. Though the four main figures radiate outward, they have retained the posture of the raised arms typical of supporting figures. The whole layout indicates that a vault served as the ultimate model. For the rose of winds in illuminated manuscripts, compare also: *Boll. della R. Soc. Geografica it.*, XLVII, 1910, pp. 269 f. An interesting mediaeval mosaic floor in Turin connected with the same tradition of cosmic vaults shows four different stages of destiny around a circle with Fortuna on a central canopy. This circle is surrounded by medallions with animal groups. The outer frame shows Oceanus with islands. In the four spandrels are twelve medallions of winds, one major and two minor in each: *Boll. d'arte*, IV, 1910, pp. 4 f.

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of the evangelists emerging from the towers of the celestial city where the twelve apostles dwell; in the four corners, four young men appear with raised arms as supports of this intermediate sphere.[152] They are characterized as the four elements, and it is notable that Water is lent the attributes of the constellation Aquarius (jar and fish), a clear indication of a background in astrological ceiling decoration. We may recall the fact, for example, that the four dancing youths, who also raise their arms to support the disk of the pagan Pantokrator Minerva in the Vatican mosaic (Fig. 8) may well be stars.[153] The second example is a vault of St. John in Pürgg (Styria, Fig. 52).[154] Here, the heavenly canopy shows the traditional disk of the Agnus Dei surrounded by the four evangelists. Its corners are supported by four male half-figures with raised arms who appear to emerge from mountains, earthbound, like the giants.[155] In this case, it is likely that the four earthly figures who support the Christian theological structure of heaven were meant to represent the *gentes*, the nations mentioned as heralds of Christian faith in an inscription surrounding the central disk.[156]

One more type should be mentioned which occurs in late and sporadic versions of mediaeval ceilings in Tuscany. It is the kneeling figure. This type of kneeling carriers of heavenly symbols ultimately goes back to old Near Eastern iconography.[157] It may be that the eight kneeling demons in the ceiling from Dendera (Fig. 7), who add their strength to that of the four women in the corners, are derived from such sources and are Egyptianized along with the rest of the representation. Though kneeling supporting figures in general are not uncommon in Roman art and though this type, too, was adopted by Atlas supporting the sphere of heaven,[158] such kneeling supports did not become a common feature of heavenly ceilings in the Roman age. Among the numerous examples of such ceilings which we have discussed, they do not occur. Their sudden reappearance in the late mediaeval age in Tuscany is, therefore, somewhat bewildering. In a cross vault of San Pietro in Civate,[159] the four rivers of Paradise appear as kneeling figures (Fig. 53). In view of the fact that we have already seen late antique reflections of a ceiling with a representation of heaven in which the naturalistically represented rivers of Paradise occupy the place usually allotted to diagonal supports (Fig. 22),[160] and in view of the well-known appearance of the rivers of Paradise in apse mosaics in churches, it may be that this type of kneeling river of Paradise on vaults has an old tradition and is actually connected with the Dendera demons. The second example is that of four youthful men who kneel on Corinthian capitals[161] and support the canopy of heaven in the Scarsella of the Baptistery in Florence (Fig. 41).[162] Their meaning is obscure, but within the context of the structure they may be related to the *nationes* of St. John in Pürgg (Fig. 52), though they are of a different type. It is worthy of note that all these revivals of early motifs, like those we found in San Marco in Venice, belong roughly to the same late mediaeval age.

One more supporting element remains to be discussed. It leads us back into the lofty realm of winged creatures. This is the support in the form of a heavenly bird. In antique ceilings, it is invariably an eagle. It appears in a diagonal position in the four outer corners of a vault from the Palatine beneath allegories of the Seasons,[163] and a thunderbolt designates it as the eagle of the sky-god Jupiter. In the same age, four eagles with globes over their heads support four of the eight sides of a central canopy in a fourth style vault from Pompeii (Fig. 54).[164] Later, at the beginning of the third century A.D., we find eagles in relief on globes, serving as actual supports in the pendentives of the dome in the Janus quadrifrons of Septimius Severus in Leptis (Fig. 55).[165] The widespread use of the motif in

152. Borrmann, *Aufnahmen . . . Deckenmalerei*, II.

153. See above, pp. 3, 5, 17, notes 17, 144.

154. Borrmann, *op. cit.*, II, 7. Graus, *Mitteil. d. k.k. Central-Commission*, Vienna, XXVIII, 1902, pp. 78 f.

155. The color allows no clear decision whether the figures emerge from mountains, or, as has been suggested to me, from clouds, or from water (compare E. Kitzinger, *Early Medieval Art in the British Museum*, London, 1940, pl. 48). It seems possible that this type was inspired by the well-known type of the Birth of Mithras: for this see F. Saxl, *Mithras*, Berlin, 1931, pp. 73 f., compare pp. 82 f. To my knowledge, no Mithraic ceiling decoration has been preserved, but it seems quite likely that images like that of the monument from Igel (H. Dragendorff and F. Krueger, *Das Grabmal von Igel*, Trier, 1924, pl. 8) and the Mithraeum of Dieburg (F. Behn, *Das Mithrasheiligtum zu Dieburg*, Berlin, 1928, pl. 2) were inspired by ceiling decorations representing the particular heaven of this religion.

156. Borrmann, *loc. cit.*: "*naciones agni praecones I. Xro. dant.*"

157. See, for example, for Achaemenid seals: A. U. Pope, *Survey of Persian Art*, Oxford, 1938, IV, pls. 123 f.

158. G. Thiele, *Antike Himmelsbilder*, Berlin, 1898, pp. 1 f.

159. P. Toesca, *op. cit.*, pp. 107 f., fig. 74. It is noteworthy that in a corresponding vault the evangelists occupy the same place; see above, note 103.

160. See above, p. 10, note 68. For rivers of Paradise and their relationship to heaven, see Weisbach, *Gaz. B.A.*, LXXXI, 1939, p. 148. Personified rivers, eight in number, two of which recline in each spandrel, occur in an interesting 3rd century mosaic from Great Britain (Morgan, *op. cit.*, pl. opp. p. 74), which may well reflect a ceiling. Unfortunately, the representation of the central disk is lost: it included some supreme person to whom Orpheus with the animals is subordinate in the surrounding circle.

161. Compare notes 139 f., p. 16, Fig. 43.

162. See above, p. 14, note 113.

163. Cameron, *op. cit.*, pl. 57, see above, note 129.

164. Niccolini, *Case e monumenti*, II, 2, *Descrizione generale*, pl. 57; P. Gusman, *Pompéi*, Paris, 1899, p. 313; *idem*, *Mural Decorations of Pompeii*, Paris, 1924, pl. 23; Ronczewski, *op. cit.*, pls. 27, 28.

165. R. Bartoccini, *Africa italiana*, IV, 1931, pp. 48 f., figs. 16–17. I owe this information to Phyllis Bober. The rather obscure remarks of Bartoccini about the construction of the dome seem to point to a canopy form. The eagle repeatedly occurs com-

late antiquity is documented by one of the chamber tombs of El Bagaouat in Egypt (Fig. 56).[166] The cupola with an oculus in the summit is decorated with a scale pattern and framed by a crown. Again in the pendentives, the outspread wings of four eagles perched on spheres support the dome. That Byzantine imperial architecture actually used such supports in tabernacle structures can be concluded from one of the miniatures of the famous Gregory codex in Paris (Fig. 57).[167] The emperor Theodosius is shown outside his throne tabernacle. Its column capitals are surmounted by eagles perched on globes: they are cosmic[168] as well as imperial symbols. They support the four corners of a dome of exactly the same type which we have in El Bagaouat. The Christian church, of course, had no use for the religious or profane pagan symbol of the eagle in its vaults. Occasionally, however, the type of the bird on the sphere does occur: a peacock (which appeared earlier with a similar function in the pagan tomb of the Aurelii, though without a sphere),[169] supplants the eagle, but it preserves the connection with the globe (Fig. 45).[170]

IV

Throughout Christian art, the heavenly visions are found in cupolas or other types of centralized vaults or in the reduced half-domes of apses. On the other hand, most of the antique decorations discussed in the preceding sections are preserved on flat ceilings or barrel vaults. Among them, however, are some cupola decorations (Figs. 3, 27, 55, 56). Moreover, a strong centralization based on a radial or concentric pattern and the grouping of symbolical elements around a central circular motif connects with this realm almost all the other decorations, whether ceilings (Figs. 5, 7, 10, 25, 28, 29, 42, 54) or reflections of ceilings on mosaic floors (Figs. 8, 9, 13, 14, 16, 18, 20). A round central field frequently appears, with its frame often imitating an opening. These oculi are a common feature of Roman cupolas, as in the Pantheon (Fig. 61). Very often we find the canopy spread out over such an oculus, which belongs structurally to the cupola type rather than to that of the non-centralized vaults. In view of all these facts, and of the lack of preserved ancient cupola decorations, it is natural to assume that in the ancient world domes were the leading monuments in the development of the vision of heaven, as they were later in the Christian world, and that the other types of ceilings rather loosely reflected and adapted the cupola decorations. Such a development would constitute but one symbolic and decorative expression of the well-known progressive centralization of Roman architecture, which was interwoven with the growing importance of vaulted construction. This explanation is enhanced by the chronological parallelism between the expansion of the theme of heavenly vision on vaults and the growth of domed construction. In both realms, there are only forerunners in the pre-Imperial time (Figs. 2, 6, 21); a few instances from the beginning of the Imperial age (Figs. 3, 7); and a notable increase in the Neronian-Flavian period (Figs. 8, 25, 27–29, 42, 54) and the second century A.D. (Figs. 5, 9, 10, 13, 14, 16, 18, 47). Finally, scanty as the remains of Roman cupola decorations may be, they are supplemented by certain literary sources, both antique and post-antique, which enable us to understand more clearly the origin, meaning, and development of this type of decoration in domes.

In fact, the earliest document of an astronomical ceiling decoration which we possess is a literary source of extreme importance. This is the famous description of an aviary which Varro gives in his book on agriculture (4, 5, 9).[171] It dates from the same period in which Antigonus of Cyrrhestus erected the Tower of the Winds in Athens.[172] This astronomical, mechanical clock is covered with a flat monolithic dome, once probably decorated with paintings. Varro's description is a strange escapade into the realm of luxury in which he himself indulged in contrast to the avowed task of his book to lead his fellow Romans back to the good old simplicity of the Roman farmer's life. Certain details of interpretation may be debated. But fortunately, the basic features of the tholus he describes are unmistakable. Varro's tholus is a circular pavilion with an outer row of stone and an inner row of wooden columns. Between these two colonnades are the screened cages of the birds. The inner circle frames an artificial pond with a little island in its center. In the dome of the tholus which was a wooden construction supported by the inner ring of wooden columns, two stars, Lucifer by day, and Hesperus by night, circle about the lower edge by some kind of mechanism. In the center of the dome, the pole of heaven, undoubtedly moved by an outer weathervane, indicates the direction of the wind by pointing with a hand toward one of the eight winds. Clearly, the winds were represented in the upper section of the dome, and here Varro refers to the

bined with star motifs on stone lintels in Syria: *Syria*, XIV, 1933, p. 254, fig. 2; D. Krencker and W. Zschietzschmann, *Römische Tempel in Syrien*, Berlin, 1938, *passim*.

166. W. de Bock, *Matériaux pour servir à l'archéologie de l'Égypte chrétienne*, St. Petersburg, 1901, pp. 19 f., fig. 81.

167. Paris, Bibl. Nat., Ms. Gr. 510, fol. 239. H. Omont, *Miniatures des plus anciens manuscrits grecs*, Paris, 1929, pl. 14; J. Braun, *Der christliche Altar*, II, Munich, 1924, p. 192.

168. In the framework of astrological speculation, eagles occur, too, in the mechanical clock in Gaza (see note 142).

169. *Monum. ant. Linc.*, XXVIII, 1922, pl. 14, p. 338, fig. 21.

170. See above, p. 15, note 120.

171. For bibl. see: Daremberg and Saglio, *op. cit.*, *s.v. Villa*, p. 886; Cato-Varro, ed. G. Keil, II, p. 245; M. L. Gothein, *Geschichte der Gartenkunst*, I, Jena, 1914, pp. 120 f.

172. For bibl. see W. Judeich, *Topographie von Athen*, 2nd ed., Munich, 1931, pp. 374 f.

analogy of the Horologium in Athens, where they appear in relief panels beneath the roof on the outside of the octagon.[173] The existence of the eight winds and the twelve or twenty-four sections through which the two stars moved during the hours of day and night, indicate a radial arrangement for the decorative framework. Whether this cupola was hemispherical or flat, Varro does not say. In order to appreciate its meaning beyond the application of technical devices to indicate weather and time, or as a horologium, we must keep in mind the implications of the whole structure: the water with its island, the birds behind which the trees of the forests appear through the outer open columns, and above, the canopy of heaven in which a mysterious power moves the stars and winds in space and time. Varro's tholus contains a curious blend of cosmic speculation (which here as well as later found interesting expression in the Roman Villa); interest in astrology,[174] which was strong in Roman society of this period; and the farmer's practical sense for the observation of weather and time. The fact that the cupola is of wood, and that no trace of such large-sized dome construction is left, calls our attention to the possibility of wooden domes in earlier antique buildings. Whether any of the round Greek structures which we know from monuments and literary sources had wooden domes is unknown. The problem has been much debated.[175] That wooden domes were used in Etruria from archaic times on is evident from their reproduction in rock-cut Etruscan tombs.[176] Such domes continued to be built in Etruria in Hellenistic (Fig. 26) and, elsewhere, in early Imperial times. They appear in several Pompeian wall paintings from the third style and later (Fig. 58),[177] with either a painted reproduction of the sky in the upper part of the dome, or with the sky visible through its central opening. Such wooden domes allowed for a wide span, and their great importance in Early Christian and Islamic architecture of the East has been discussed by Cresswell.[178] We shall return several times to their rôle in the development of the vision of heaven. To what extent they were used in Greece and Rome; whether they were decorated with celestial representations in the earlier periods; and if so, of what kind — in other words, how broad the background of Varro's aviary was — are questions which cannot be answered on the basis of our present knowledge. But from his own references to the aviaries in other villas of his time, one would assume that Varro's structure reproduced a fully developed type.

These large wooden domes of cosmic character cannot have failed to inspire both the development of stone cupolas

173. Thomas Jefferson, who may rightly be suspected of having read Varro's *De re rustica*, may have borrowed the idea for a mechanical version of this contraption in Monticello: "In the ceiling of the east portico is a compass of a diameter of two feet, connected with a weathervane on the roof. Here also is a clock face of the same dimensions over the door . . . he could tell the hour or the direction of the wind without leaving his chair" (P. Wilsted, *Jefferson and Monticello*, New York, 1921, p. 107; see also Fiske Kimball, *Thomas Jefferson, Architect and Builder*, Richmond, 1931, pl. 8). Attention may also be called to two of his sketches for observation towers. One shows a rounded tholus with a cloister vault in the upper story, while the other (after Stuart-Revett) follows the model of the Tower of the Winds in its octagonal form. Both culminate in a finial with a weathervane on a sphere: Fiske Kimball, *Thomas Jefferson, Architect*, Boston, 1916, figs. 38–39. See also below, p. 25.

174. See F. Boll, *Sternglaube*, pp. 100 f.; G. Kroll, *Die Kultur der Ciceronischen Zeit*, Leipzig, 1933, II, p. 14, with bibl.

175. For the alleged wooden domes of Greek tholoi, see: G. Kabbadias, *Mélanges Nicole*, Geneva, 1905, p. 611; H. Pomtow, *Klio*, XII, 1912, pp. 216 f.; H. Thiersch, *Zeitschrift für Geschichte der Architektur*, II, 1909, pp. 33 f. See, however, the critical remarks of J. Charbonneaux, *Fouilles de Delphes*, II, 4, fasc. 2, pp. 9 f., and *B.C.H.*, XLIX, 1925, pp. 158 f.

176. I refer to a group of archaic Etruscan tomb ceilings in which earlier critics (*Annali*, 1832, pp. 265 f.) have rightly recognized a "demi-voûte sphérique." See also J. Martha, *L'art étrusque*, Paris, 1889, pp. 154 f., figs. 122 f. Compare further for this type: Canina, *Etruria maritima*, I, Rome, 1846, pl. 68; Dennis, *Cities and Cemeteries*, I, pp. 274, 448; *Monumenti dell'Ist.*, I, 1829, pl. 41. The most recent and comprehensive discussion of the type is found in A. Ackerstroem, *Studien über die etruskischen Kammergräber*, Lund, 1934, pp. 26, 68, 88. Mr. Ackerstroem denies the interpretation as a wooden dome and recognizes instead the imitation of the hipped roof of a house with two apsidal ends. There are several grave objections to be raised against this theory: (a) No such house-type is known from Italy; (b) The "fan-shaped" decoration is invariably restricted to the entrance hall of the tomb and not found in the rear sections; (c) The ground plan is rectangular and the roof construction with concentric circles of horizontal rafters clearly indicates a dome above a square, a type which occurs with rudimentary pendentives even in stone constructions in later Etruscan tombs (Ackerstroem, *op. cit.*, pp. 134, 144, 153 f.); (d) As Ackerstroem's photographic illustration (fig. 6) shows particularly well, the idea of a hall with a rounded dome which, just beyond the center, is cut off by the door wall of the inner chamber, is clearly expressed by the continuing radiation of the rafters beyond the central shield in the summit. This type of wooden construction in which the upper ends of curved vertical ribs are fastened to a circular disk beneath them, explains the curious passage of Servius, *Ad. Verg., Aen.* IX, 40: "tholus proprie est veluti scutum breve quod in medio tecto est, in quo trabes coeunt." See also the central disk in the canopy of our Fig. 26. One of these early tombs in Vulci was called after its discovery "Tomba del Sole e della Luna." Ackerstroem and F. Messerschmidt, *Nekropolen von Vulci*, *Jahrb. arch. Inst.*, Erg. Heft, XII, 1930, p. 25, note 1, derive the name from the "fan-shaped ceiling." But this would account for only one of the two heavenly bodies attached to the tomb by this name. It seems to me that the name must have referred, like the names of the majority of Etruscan tombs, to some element of the painted decoration which soon after disappeared, as was usually the case. Could sun and moon have been painted on the disk in the center of the vault? In view of what we have seen before, this does not seem impossible.

177. (a) Fig. 58, House of Caecilius Jucundus: E. Presuhn, *Pompéi*, Leipzig, 1878, I, pl. 5; V. Steeger, *The Most Beautiful Walls of Pompeii*, Rome, 1877, pl. 5; P. Gusman, *Pompéi*, pl. 10; *idem*, *Mural Decorations*, pl. 11; Cook, *Zeus*, III, 1, pp. 443 f. The cupola is clearly wooden and of brown color. (b) Villa of Diomedes: Niccolini, *op. cit.*, II, 1, pl. 4, with open skylight. (c) Stabian Baths, fourth style: *ibid.*, I, 2, pl. 4, with red circular disk in center.

178. Cresswell, *Early Muslim Architecture*, I, pp. 42 f., 83 f.

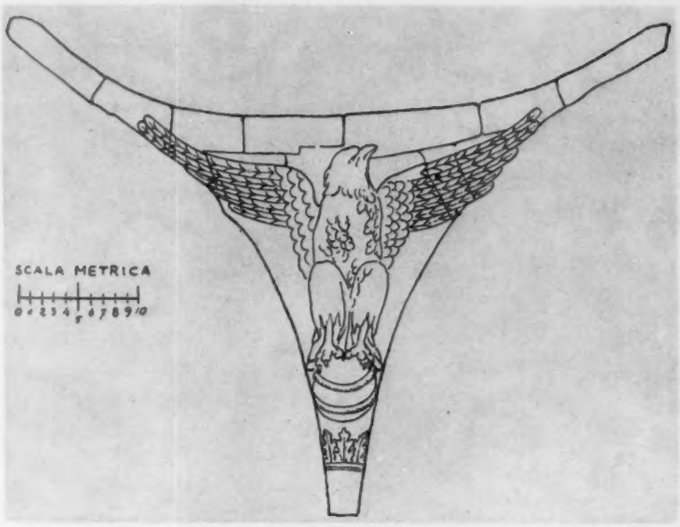

FIG. 55. Leptis Magna, Arch of Septimius Severus: Spandrel

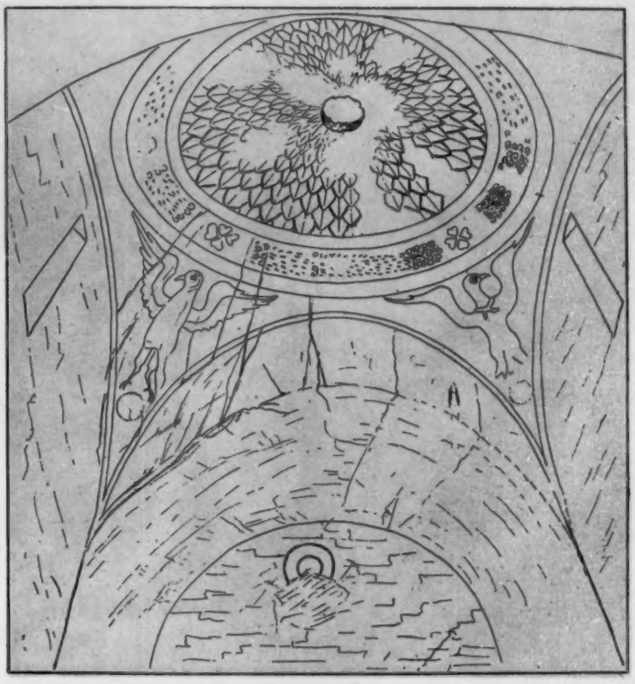

FIG. 56. El Bagaouat: Dome of Tomb

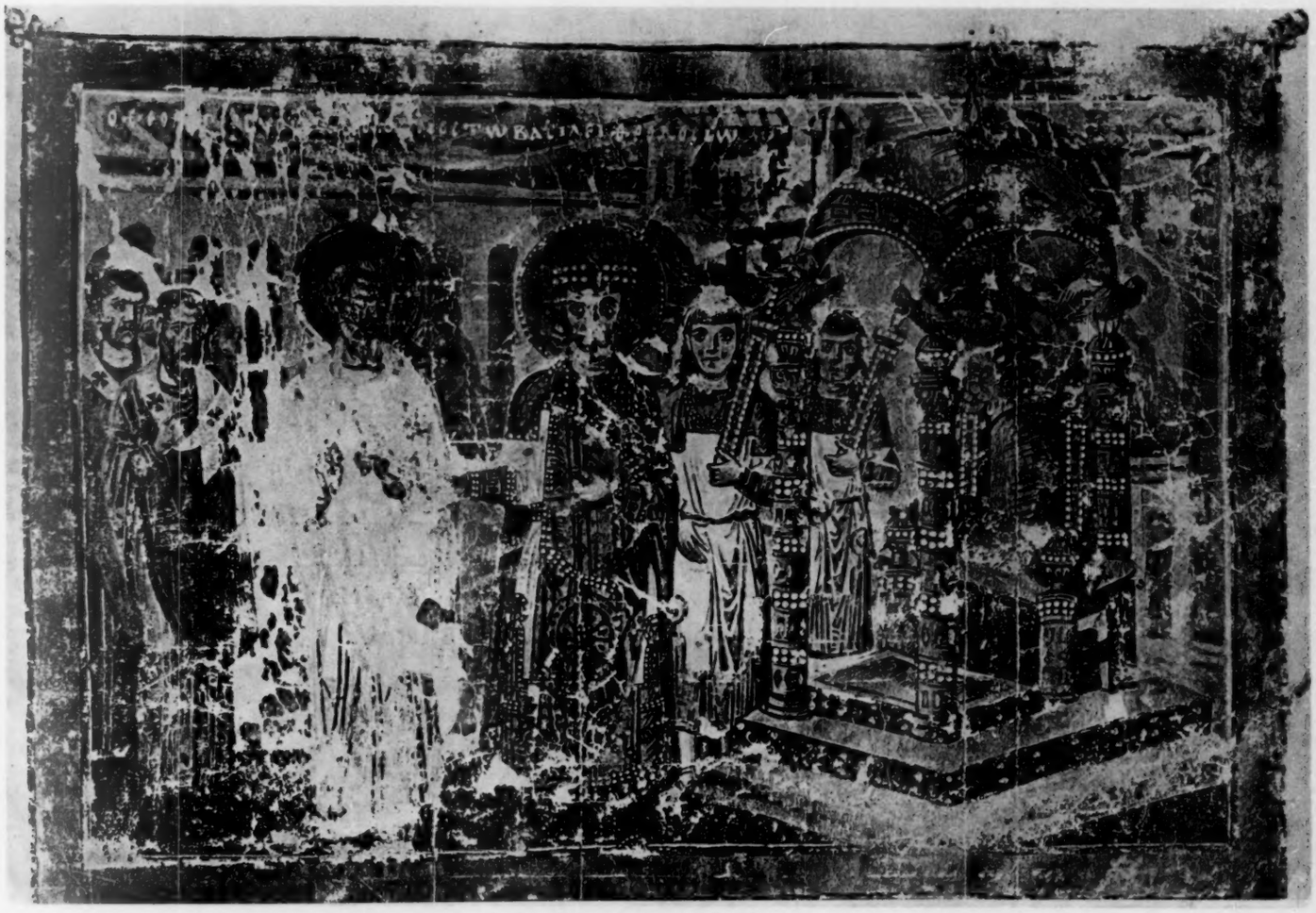

FIG. 57. Paris, Bibl. Nat.: Ms. Gr. 510, Theodosius and St. Gregory, Fol. 230

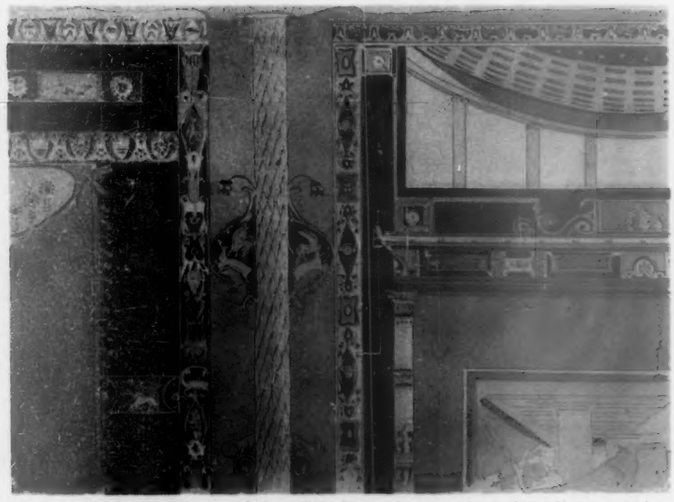

FIG. 58. **Pompeii, House of Caecilius Jucundus**: Section of Wall Decoration

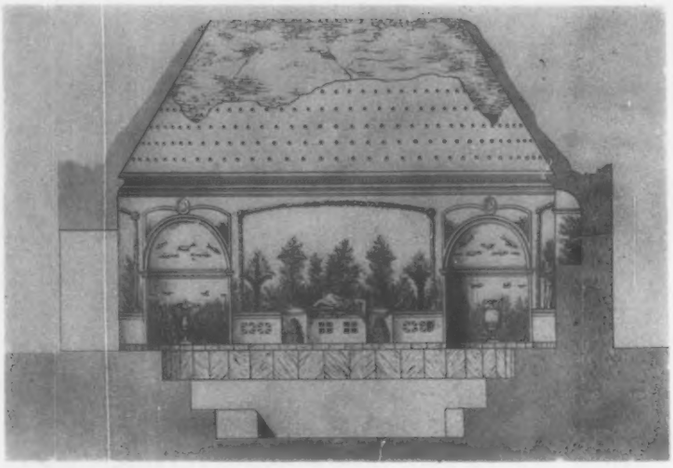

FIG. 59. **Pompeii, Stabian Baths**: Frigidarium, Section

FIG. 60. **Baiae, So-called Temple of Mercury**

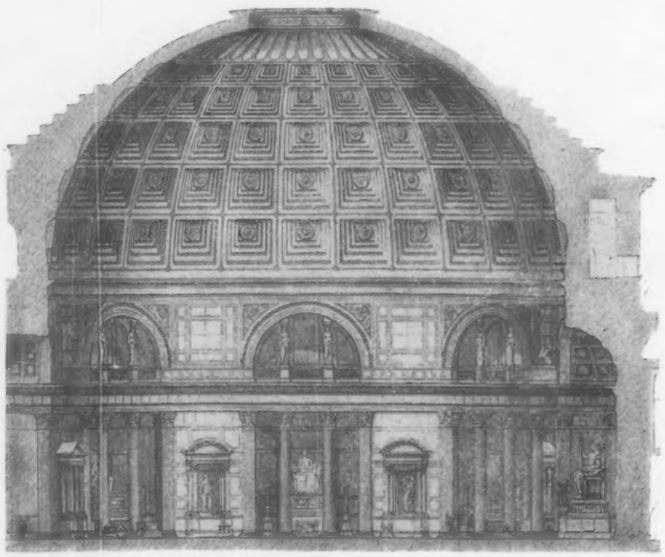

FIG. 61. **Rome, Pantheon**: Restored Section (Durm)

and their decoration in early Imperial times. It is this age which introduced large stone domes exceeding in size and ambition the small cupolas that had previously existed, especially in Egypt and the Near East.[179] In the development, both of domed construction of monumental size in Roman architecture, as well as of vaulted construction in general, the Roman thermae played a leading part. The domes of bathing halls of the second and first centuries B.C. in Pompeii are still small. In one case the later decoration of a dome is the blue sky with ornamental stars (Fig. 59). The case is a forerunner of the long development in Early Christian vaults, which in itself is evidence of the widespread use of this scheme. It may well date back to the Roman Republic.

The first large dome which we know is to be found in the hall of a thermae building of the Augustan age, the so-called Temple of Mercury in Baiae (Fig. 60).[180] Though it has completely lost its decoration, so that we are unable to say whether it was celestial, it is of considerable importance to our discussion. The type with an open circular "eye" in the center and four additional diagonally arranged, and in this case, square skylights, is analogous to the scheme of a number of celestial ceilings mentioned and illustrated in the preceding sections. The cupola decoration from the Golden House (Fig. 27), in which four diagonal skylights interrupt the decorative system, differs from the dome of Baiae only insofar as the pictorial celestial vision replaces the oculus. On the other hand, the influence of this type of cupola and its celestial decoration on other vaults is clearly visible in a vault from the Palatine (Fig. 62)[181] which may be even earlier. In this vault a central celestial canopy around an "eye" in which Luna appears riding over the heavens, is combined with four diagonal minor canopies. Spreading the celestial canopy over a cupola skylight clearly inspired such decorative arrangements; and it is clear that a long line of celestial and loosely related Roman ceiling decorations (Fig. 54)[182] is rooted in such domes. It is obvious, too, that even in Baiae the cupola could easily have been decorated with a canopy surrounding the open central skylight, as many centuries later such a scheme was still retained in the Baptistery in Florence (Fig. 32). With the exception, therefore, of the central picture, the complete scheme of the dome from the Golden House (Fig. 27) can be applied to that of the Temple of Mercury (Fig. 60). These connections show the great impact of monumentalized dome construction on the celestial decoration of vaults. They further suggest that this theme was developed in the cupolas of early Imperial Rome.

In the East, at the same time, we find the flat early Roman dome of Palmyra with its canopy of heaven (Fig. 3). Its structural type is different, however, and its playful form with the center blown upward, as it were, is analogous to the flat segment of early Roman pseudo-cupolas in Alexandrian tombs.[183] It will be noted that the ceiling from Dendera (Fig. 7), though flat, reflects the same constructive type, the two lateral bands being decorated with the zig-zag symbol of water. The type is also reflected in later celestial ceilings from the Golden House (Fig. 28) and Tivoli (Fig. 29).

The Golden House of Nero, which has retained so many visions of heaven on its ceilings, also marks an important development in the use of monumental cupola construction. In the section still preserved, which is only a small though significant portion on the lower periphery of the once enormous complex, there is a vast octagonal domed hall with a skylight in the center.[184] Unfortunately, no fragment of the dome decoration has been preserved. Considering the fact that literary sources indicate the beginning of the common practice of decorating vaults with mosaic in this age and that this art is reflected in the fountain mosaics from Pompeii,[185] the lack of preservation of such mosaics from

179. In the discussion of the development of domed construction, wooden domes are generally neglected. See, for example, R. Delbrück's otherwise very useful survey in *Hellenistische Bauten in Latium*, II, Strassburg, 1912, pp. 78 f. Neither does H. Thompson, in his fine monograph on the Tholos in Athens (*Hesperia*, Suppl., IV, 1940, pp. 42 f.), consider the possibility of a wooden dome for the later stage of that building, a solution entirely compatible with the evidence he submits. The best discussions of the development of domes are those by Cresswell, *op. cit.*, pp. 304 f. (also: *Burl. Mag.*, XXVI, 1915, pp. 146 f.). See also O. Reuther, in *Survey of Persian Art*, Oxford, 1938, I, pp. 501 f. However old the construction of small domes in Egypt and the Near East may be, and however many technical contributions the latter regions may have made, the essential fact in the development of Western, Byzantine and Islamic architecture is the monumentalization of dome construction in Roman Imperial architecture, which set an entirely new standard. No large dome structures were built in the East before this influence was received.

180. A. Maiuri, *I campi Flegrei*, Rome, 1934, pp. 66 f. For a similar thermal hall near Pisa, with an oculus and eight additional skylights around it, see Cameron, *op. cit.*, p. 48 (p. 51 of the French text). The vault has ribs, which indicates that the building was not earlier than the 2nd century A.D.

181. Cameron, *op. cit.*, pl. 58.

182. Golden House, Volta Dorata: above, note 102; the purely formal analysis of the pattern of this vault by F. Saxl, *Wiener Jahrbuch f. Kunstgesch.*, II, 1922, p. 92, does not consider this connection and shows the danger of approaching such problems purely from the point of view of "abstract" pattern. Golden House, Ponce, *Description*, pl. 57; Cameron, *op. cit.*, pl. 57. Tomb of Hermes, above, note 62. A loose adaptation is found in the tomb no. 2 Corsini (Bartoli, *Sepolcri*, pl. 6). In another ceiling from the Golden House (Cameron, *op. cit.*, pl. 64), a central canopy, framing an "eye" with a flying figure, is surrounded by eight circular minor "eyes" like those of the thermal hall near Pisa, mentioned in note 180.

183. *Bull. Soc. Arch. Alex.*, III, 1900, pls. 4, 6. See also Delbrück, *loc. cit.*

184. It has a cloister-vault buttressed by an interesting group of radial "chapels" with barrel vaults. G. Lugli, *The Classical Monuments of Rome*, Rome, n.d., p. 191, fig. 45, room 84, p. 194.

185. *Boll. d'arte*, VIII, 1914, pp. 273 f. Of particular interest is the Fontana degli Scienziati (p. 274) which shows a niche with

Roman thermae and villas is particularly deplorable. The most famous feature of the Golden House was the great circular dining hall which turned around "like the world."[186] It may well be that it was this outstanding feature of the building, and its gilded roof, which gave rise to the name, Domus Aurea. Indeed, we know of a curious and surely related repetition of the name Golden House in a later Islamic palace thus termed because of its gilded dome.[187] And it is also in the Islamic world that we find an explanation of the manner in which such a dome revolved; in the basement, horses were harnessed to ropes, and as they circled, the dome rotated.[188] Such a structure, of course, had to be wooden, and this material as well as the mechanical movement relates Nero's dining hall to Varro's aviary. A curious passage in Seneca (*ep.* 90,15) throws further light on the nature of this mechanism; he mentions a dining room so cleverly constructed "with a ceiling of movable panels that it presents one appearance after another, the roof changing as often as the courses."[189] It is evident that Seneca describes a mechanism in which both the framework and the panelling above it move, apparently in opposite directions; this was clearly a device to increase the effect of motion. That he alludes to Nero's dining hall is very likely. It is also clear that the changing aspects of this cosmic dome revealed heavenly bodies and that it constituted a kind of planetarium. Martial may well refer to this structure of the Neronian palace, still extant in his period, when he mentions a tholus as an imperial dining hall (*epigr.* II, 59,2). In another passage he refers to the stars and to the pole over Domitian's head (7,56). This fantastic structure, in which the Lord of the Oecumene feasted with his guests in the center of the cosmos, just as he appeared on his canopy as the sun god amidst the stars of heaven,[190] is a successor and expansion of Varro's tholus in idea, construction, and decoration. In addition, it combines the cosmic speculation of learned men of philhellenic Roman republican society with the religious-political symbolism of the Roman empire. And it is this tradition which later continues in the appearance of the Christian Kosmokrator in the heavenly dome or in the throne-hall of Chosroes.

In this connection, an extremely interesting passage from Philostratus' *Life of Apollonius of Tyana* should be mentioned. On the occasion of the philosopher's visit to Babylon, he describes a palatial hall as follows, "He reports that he also saw a hall, the ceiling of which was constructed in the form of a dome, like the heavens, covered with sapphire stone — this stone being intensely blue and of the color of the sky — and in the heights are the images of the gods in whom they believe and they appear golden as if it were from the ether."[191] Whether or not Philostratus found precisely this description in the alleged documents of Apollonius; whether or not he elaborated a suggestion; whether or not Apollonius had really seen such a structure in the Parthian empire about 100 A.D., and whether or not the report has other sources, fantastically exaggerated, we cannot decide. In any case the text is a document for the existence of a mosaic cupola with representations of Eastern astral gods in the upper regions of the blue sky. It is also interesting to note that this hall was used by the king for giving judgment, as Philostratus remarks; a use which relates it again to Rome, with the astrological ceiling of Septimius Severus in his basilica on the Palatine.[192]

Next in chronological order follows the Hadrianic Pantheon, the character of which has been much debated.[193] While some scholars interpret it as a kind of shrine of the planets, others are sceptical about such an explanation. In view of the development traced here, the scale seems to go down in favor of an astrological interpretation of the whole structure. However that may be, we possess an unequivocal document for the interpretation of the cupola of this famous building as a symbol of heaven. Dio Cassius (*Hist.*, LIII, 27) discusses the name Pantheon as follows, "It is called thus possibly because it included images of many gods in its statues, amongst them those of Ares and Aphrodite; but I believe that the reason is the similarity of its cupola-form to the heavens." It has been said that Dio's idea was suggested by a starry decoration of the coffers of the dome, which is probable, though by no means documented. But the important fact is that the coffer decoration stops some distance below the skylight (Fig. 61),[194] and this fact has led some modern restorers to suggest the presence of a can-

a half canopy, and, on the upper walls around it, the perspective design of a section of a dome with decoration.

186. Sueton., *Nero*, 31: "cenationes laqueatae tabulis eburneis versatilibus, uti flores, fistulatis, ut unguamenta desuper spargerentur; praecipua cenationum rotunda, quae perpetuo diebus ac noctibus vice mundi circumageretur."

187. Cresswell, *op. cit.*, p. 87.

188. See below, p. 25.

189. In the text, I have given the translation of R. M. Gummere, *Seneca* (Loeb Class. Library), who correctly relates the passage in note 6 to Nero's dining hall. I have preferred, however, to translate "facies" by "appearance" instead of "pattern."

190. See above, p. 11.

191. I, 25. See R. Eisler, *op. cit.* (note 7), II, p. 614; Cook, *Zeus*, I, 1914, pp. 262 f.; F. Saxl, *Wiener Jahrb.*, II, p. 111. For the wheels suspended from this dome, see G. M. Nelson, *A.J.A.*, XLIV, 1940, pp. 449 f., as well as for interesting connections with the Sirens and the music of the spheres.

192. Above, pp. 8 f.

193. For bibl. see: Platner and Ashby, *A Topographical Dictionary of Ancient Rome*, Oxford, 1929, pp. 382 f. For arguments against Mommsen's theory of the Temple of the Planets, E. Maass, *Die Tagesgötter*, Berlin, 1902, pp. 287 f.; O. Weinreich, *Sitz. Ber. Heidelberg. Ak., Phil. Hist. Kl.*, 1913, 5, p. 72. For this theory: F. Boll, *Sternglaube*, p. 273; Cook, *op. cit.*, III, 1940, pp. 353, 441 f.

194. Ronczewski, *op. cit.*, pl. 3. He stresses (p. 6) the point that in construction the use of coffers to the upper edge would have

opy or shell-like element in this area. Again we cannot say what actually existed at this point. But that this place was occupied by a symbolical or figural representation of celestial character in painting or mosaic or stucco is indicated by the very system as well as by Dio's interpretation.

In this period of Hadrian and the elaborate celestial ceiling decorations in his villa (Figs. 5, 10, 29), documented evidence for the dome of heaven in pre-Constantinian art ends. The lack of literary sources is complete. It is part of the deplorably poor tradition about history and buildings in the second and third centuries of our era. It should be kept in mind, however, that the sources and monuments discussed here are the only sources whatsoever which refer to the decoration of large domes even in the early Imperial age: without exception, they point to the celestial character of these structures.

From Constantine on, we meet the long series of visions of heaven on domes and vaults, some instances of which we have discussed and included in our illustrations (Figs. 1, 7, 11, 12, 19, 30, 31, 32, 41, 44, 45, 46, 51, 52, 53). The root of this tradition, which we established generally in the realm of a long and increasing symbolism of heaven on ancient ceilings, is evidently in a more specific sense to be found in the decoration of domes in the Roman Imperial period. The decoration also survived in non-ecclesiastical domes of the Byzantine and Islamic world, which likewise can be rightly appreciated only against this tradition.[195] One of the later examples is the cupola decoration of a tomb in El Bagaouat (Fig. 56) which probably dates from the fifth century A.D. It shows the canopy of heaven decorated with an aegis pattern and with eagles on spheres[196] as corner supports alluding to the celestial rule of the sky. The connection between this decoration and the appearance of the throne-tabernacle of the Byzantine emperor (Fig. 57) has been pointed out before. In a tomb structure, evidently of pagan tradition, the association of an apotheosis canopy (Fig. 23) with the symbolism of imperial glorification continues a traditional fusion and exchange between these two realms. We possess another interesting Byzantine document in the description of the Bath of Oecumenius. It displayed a zodiac frigidarium and the apparent representation of the planets in seven different niches. The Seasons were shown in four other halls.[197] Likely as it may seem, we cannot be sure that these representations were on ceilings. They could have been floor mosaics, inasmuch as the motif of the zodiac floor is also widespread and traditional (Fig. 14).[198]

The most remarkable document of a dome of heaven outside the ecclesiastical sphere is John of Gaza's long description of a cupola decoration in painting or mosaic in a bath in Gaza or Antioch probably written in the sixth century.[199] Because of the poetic nature of the source G. Krahmer's reconstruction (Fig. 63) gives only a vague idea of the representations and their approximate distribution in the dome. The lack of decorative arrangement is hardly satisfactory and it seems quite possible that the system was much more highly organized within an ornamental framework, which the poet did not mention since it was of no intellectual interest. A strange array of astronomical elements such as the sun and moon, the globe of earth, and Orthros, also includes Phosphorus and Hesperus, the only stars of Varro's tholus. The cruciform symbol of Christian tradition, which had already figured as the leading star in Constantine's palace, occupies the highest place.[200] The pagan gods and even the planets have been eliminated. Only the elements of time and space and the forces of nature are kept: Aion, Dawn, the Seasons,[201] the Hours,[202] Anatole and Nyx symbolize movement in time; Oceanus,[203] Thalassa, Ge, Europe, Asia, and Ouranus illustrate cosmic space; the Winds,[204] Storms, Rains, Lightning, Thunder, and the Rainbow[205] appear as the elementary forces of nature. The Phoenix[206] refers to life's eternal renewal, while Wisdom and Virtue are coupled with the bodily strength of Atlas in supporting the sun globe of light which is both physical and intellectual. At the height, near the cross, an allegorical group of Cosmos triumphing over Physis and crowned by the supreme Ether resumes the underlying ideology. In this intellectual combination of various elements of descriptive astronomy, religious vision, and abstract symbolism, we re-encounter that fusion of

advantageously reduced the weight of the top part, and he suggests (p. 10) painting in this upper section. See also G. Rivoira, *Roman Architecture*, Oxford, 1925, p. 125, fig. 140.

195. It may be noted that the common occurrence of celestial motifs on Syrian lintels (above, note 165) gives evidence of the general use of such decoration throughout the Empire.

196. Above, p. 19, note 166.

197. Kodinos, *Top.*, 18; Richter, *Quellen der byzantinischen Kunstgeschichte*, II, Leipzig, 1897, p. 256.

198. See above, pp. 5, 9 f.; notes 53–55.

199. P. Friedländer, *op. cit.*; G. Krahmer, *op. cit.* The first to recognize the decoration as belonging to a dome was A. Trendelenburg, *Jahrb. arch. Inst.*, XXVII, 1912, *Anzeiger*, pp. 47 f. See Krahmer, *op. cit.*, p. 56. Compare above, p. 15; notes 47, 63, 125. For details, see also: G. Downey, *Antioch-on-the-Orontes*, II, Princeton, 1938, pp. 205 f., with further bibl.; G. M. Hanfmann, *Latomus*, III, 1939, pp. 111 f.

200. See above, p. 8, note 46. The scepticism of Downey, *op. cit.*, pp. 212 f. (cf. Hanfmann, *op. cit.*, p. 112) about the Christian character of this cross seems to me unjustified. I fail also to see why the relatively limited number of Christian motifs in the decoration of a non-ecclesiastical structure of this period should lead to the conclusion that the work was "pagan" or based upon a pre-Christian model.

201. See above, pp. 15 f.

202. See above, pp. 3 f., 5, 7, 15 f.

203. Note the analogy with the Oceanus river along the lower edge of the cupola of Santa Costanza, Fig. 31, and below, note 207.

204. Compare above, note 151.

205. Compare above, p. 10, note 63.

206. Compare above, p. 19, note 168.

three different trends which had existed and entered into various combinations ever since the early Imperial age. However, the fusion of pagan tradition and Christian faith in a realm of lofty intellectual speculation, as well as the extent and comprehensiveness of the illustration of the cosmic structure, is new. New also is the introduction of moral-philosophical allegory. All these are expressions of the systematic Byzantine mind. But the basic idea of this vision of an intellectualized and spiritualized heaven on the dome, like that of many of its individual elements, is clearly rooted in a now aging antique tradition.[207]

Two more monuments illustrate the Islamic branch which grew from the late antique root of heavenly domes. They deserve a brief discussion here. The earlier one is the description of the "Throne of Chosroes" which is found in both Arabic and Western mediaeval sources. In several respects these sources are rather vague, and at first sight they seem to contradict each other. The two scholars[208] who discussed them at length in recent years, have reached widely divergent conclusions. E. Herzfeld, who first collected the sources,[209] believed that two heterogeneous elements were fused in the descriptions. He assumed that the actual core of reality underlying them was a mechanical clock with astrological elements, and that the fabulous idea of a king's jeweled throne had been confused with these accounts. F. Saxl,[210] on the other hand, recognized elements of a regal throne and baldachin decorated with celestial figures. But he concluded that in the sources, the vague idea of such a structure was developed from apocalyptic visions into fabulous narratives about something which never existed. Neither author considered the connection with the long and well established tradition which is the subject of our discussion. Within the framework of this tradition, every single element of the descriptions receives its explanation, however fairy-tale-like its garb and however much it may stress the luxurious and miraculous. The sources are unanimous in reporting a domed structure in a palace.[211] It is decorated in blue (lapis lazuli) and gold.[212] The representation includes: stars,[213] the zodiac,[214] the planets,[215] sun and moon,[216] astrapai,[217] kings,[218] among them Chosroes,[219] and subordinate figures of "angels."[220] The Byzantine sources limit themselves to a description of this dome, but Islamic writers and Ado of Vienna quite clearly distinguish the throne from the hall in which it stands. The throne is decorated with gilded and jeweled brocades.[221] Each of four tapestries shows the picture of a Season.[222] These items are all well-known in our tradition, for we have traced the decoration of cupolas with heavenly representations of astronomical character from the early Imperial age. Such decoration appeared in Imperial palaces. The horoscope character of the image of heaven in connection with the throne of the ruler was developed by the time of Septimius Severus,[223] the representation of the ruler himself among the stars took form as early as the period of Nero.[224] In fact, there is not a single part of the representations mentioned which does not occur in Roman or Byzantine ceilings. The dome of heaven over the jeweled throne of the ruler appears in the representation of Theodosius in the Paris Gregory (Fig. 57). A later artist, probably using some earlier iconographic tradition, pictured the Throne of Chosroes in a similar fashion (Fig. 64);[225] he, too, represented the structure as an open monopteros in order to make the throne visible, although in reality it was evidently an interior throne hall. In view of all these circumstances, and of the fact that in the cupola of Quseir Amra an early Islamic dome of heaven is actually preserved (Fig. 65), it is surprising to witness the reluctance of modern scholars to accept these descriptions at face value. The reason may be the presence of another item which looms particularly large in the Western sources. But it is also confirmed by one of the two Islamic writers. We are told that the dome revolved, causing a terrifying noise like thunder,[226] and that drops of a liquid "like rain" came down from the

207. Aside from the analogies found in earlier monuments and already noted, there is a curious description of a ceiling in a palace by Valerius Flaccus, *Argonautica*, v, 410 f.: ". . . tale iubar per tecta micat. stat ferreus Atlans Oceano genibusque tumens infringitur unda; at media per terga senis rapit ipsa nitentes altus equos curvoque diem subtexit Olympo; pone rota breviore soror densaeque sequuntur Pliades et matidis rorantes crinibus ignes." The presence of the Sun-god ascending over and behind Atlas in his chariot; of Oceanus; the Moon-goddess on her chariot; the Pleiades and Hyades — all connect this description with that given by John of Gaza five centuries later. On the other hand, the emphasis on the curve of the sky (curvo Olympo) points to the decoration of a dome or vault, and it may well be that the poet was inspired by some part of the Domus Aurea.

208. E. Herzfeld, *Jahrb. d. preuss. Kunstsammlungen*, XLI, 1920, I, pp. 103 f.; F. Saxl, *Jahrb. für Kunstgeschichte*, II, 1923, pp. 102 f.

209. *Op. cit.*

210. *Op. cit.*

211. The sources are published in the articles referred to in note 208 and need no repetition here. For the domed structure: Al Tha'álibi, Firdausi, Cedrenus, Gregorius Monachus. Ado, probably by error of translation, calls the structure a "tower."

212. Al Tha'álibi.

213. *Idem*, Firdausi, Cedrenus, Ado.

214. Al Tha'álibi, Firdausi.

215. *Idem.*

216. Cedrenus, Ado, Nikephoros. Ado mentions the detail that the sun appears in the classical form of a charioteer.

217. Nikephoros. Compare the group of Bronte and Astrape in the Gaza dome, Fig. 63.

218. Al Tha'álibi.

219. Cedrenus, Nikephoros.

220. *Idem.* Believed by Gundel, *op. cit.*, p. 182, to be the Decani.

221. Al Tha'álibi, Firdausi.

222. Al Tha'álibi. According to Firdausi, the seven planets and historical personalities were also on these tapestries.

223. See above, pp. 8 f.

224. See above, p. 11.

225. Flemish gobelin in Saragossa, Saxl, *op. cit.*, p. 108, fig. 75.

226. Al Tha'álibi, Cedrenus, Ado, Nikephoros, Tzetzes.

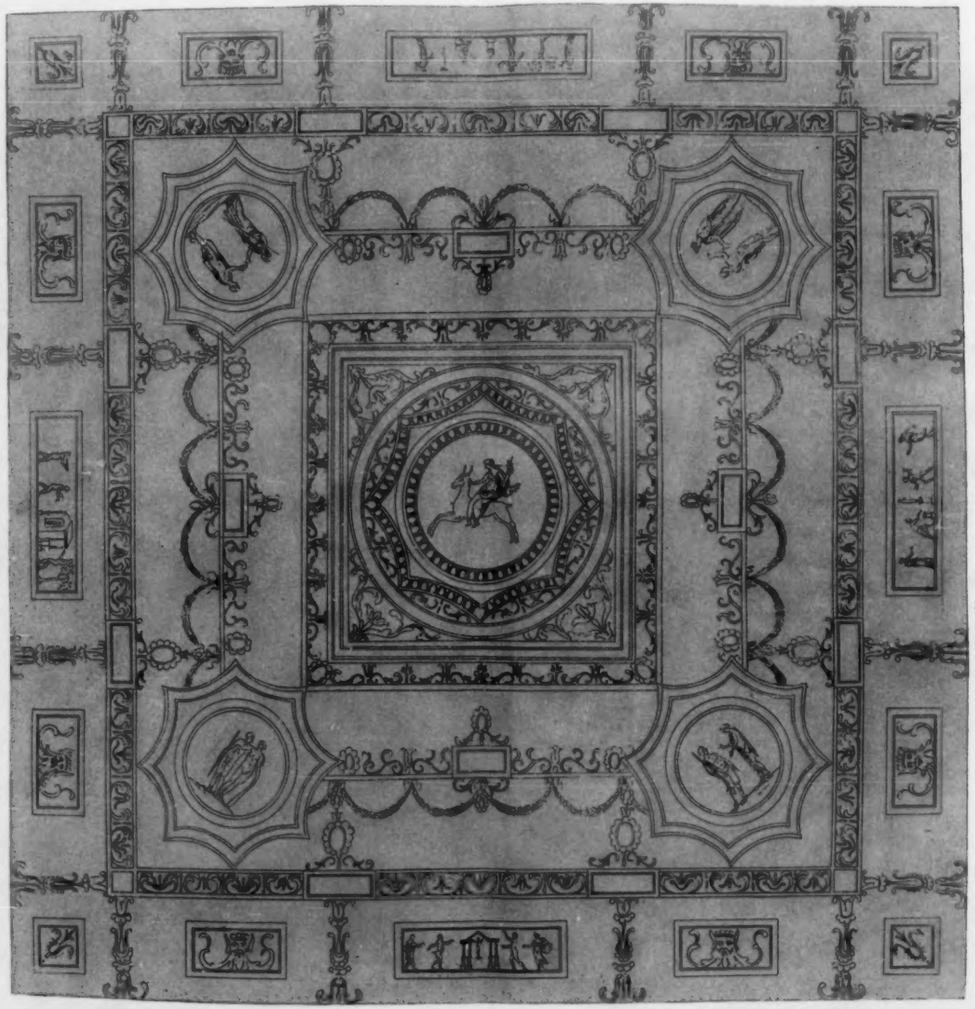

FIG. 62. Rome, Palatine: Decoration of a Vault (Cameron)

FIG. 63. Decoration of a Dome, Described by John of Gaza (Krahmer)

FIG. 64. Saragossa: Flemish Tapestry, Throne of Chosroes

FIG. 65. Quseir Amra: Dome of Bath

FIG. 66. Dresden, Cod. Dresd. Dc. 183, Observatory, Fol. 13

FIG. 67. Pompeii: Detail of Wall Decoration

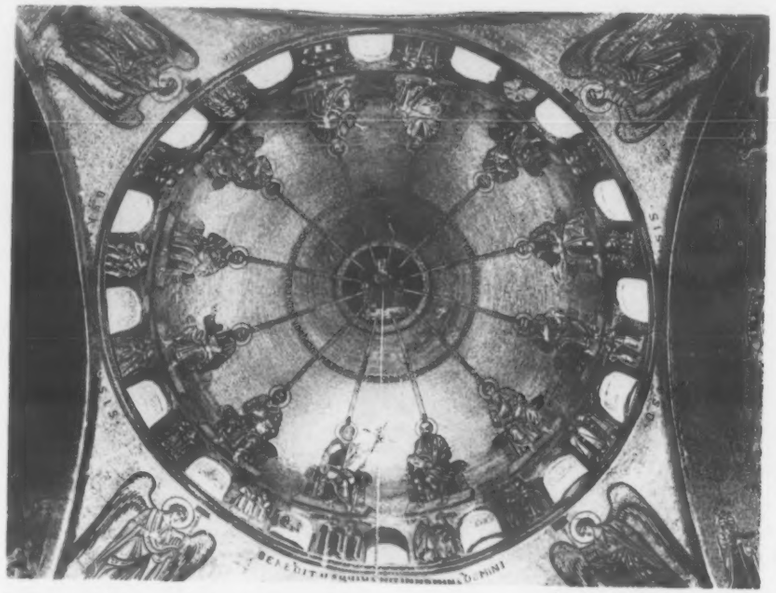

FIG. 68. Venice, San Marco: Pentecost Cupola

FIG. 69. Paris, Bibl. Nat.: Cod. Lat. 1428, Pentecost

dome.[227] It is no wonder that modern writers have been sceptical of such a seemingly fantastic story. But the fact is that this rotation of the heavenly dome had its actual forerunner in the famous dining hall of Nero's Golden House which is beyond suspicion of being a literary fantasy, inasmuch as it was seen and described by contemporary writers. As it is, the elaborate description of the mechanism of the Throne of Chosroes given by Ado throws light on the way in which these wooden domes, Nero's as well as Chosroes', were moved. He says that horses moved around in a basement, and by means of a rope mechanism, dragged the structure into its revolving movement.[228] In view of this connection between the throne hall of Chosroes and the dining hall of Nero, it is interesting to see that even the seemingly fabulous feature of liquid sprayed from the dome like rain by means of hidden pipes,[229] has its antecedent in the same Roman tradition. Suetonius reports that in the Golden House perfumes were sprayed on the dinner guests from holes in the ceiling, and he may well refer to the circular dining hall.[230] This, again, reveals the tradition of such customs as well as the actual existence of the throne hall of Chosroes.

We have already mentioned the most completely preserved astronomical cupola decoration, that found in the caldarium of the early Islamic palatial bath in Quseir Amra (Fig. 65).[231] It is a purely descriptive representation. Deprived of visionary and symbolical features, it constitutes a purely "scientific" use of the already long established, continuous tradition of domes of heaven. The idea of decorating the cupolas of baths with the bodies of heaven continued long after in the Islamic world.[232]

In this learned early mediaeval atmosphere, in which the astrological tradition of the antique age continued both in the Islamic and in the Western world, we find the representation in manuscripts of an astronomical observatory: it has the form of a domed monopteros with ten columns. Within, a columnar support carries a globe of heaven adorned with the zodiac and capable of being turned around on a handle (Fig. 66).[233] Though the copyists of two ninth-century manuscripts which repeat the same earlier model misunderstood the space relationship between the structure and the globe beneath its dome, the scheme of this observatory is evident.[234] Many centuries earlier we find the same type of structure included in the decorative patterns of a Pompeian wall in the playful manner of the third style (Fig. 67).[235] Here, the heavenly sphere and its network, a common feature of ancient globes,[236] is supported by a "candelabrum" within a circular building having a roof in the form of a cone with a concave contour. The inner ceiling is decorated with a canopy of heaven and its concave edges frame a central disk, as is so often the case. The connection of the picture with actual observatory structures is further indicated by the console-shaped decorations on the roof, which occur centuries earlier in a real structure, the Lysikrates monument, and later, in Byzantine book illustration.[237] In the fresco, the consoles support griffins, which are animals of solar significance. This type of observatory structure adds a last interesting "scientific" note to the long series of monuments of celestial speculation.

The modern planetarium, in the age of technical civilization and popular instruction, seems to lack connection with these antique and mediaeval observatories. Yet, it may be appropriate in this respect to refer to a curious scheme conceived by Thomas Jefferson for the astronomical instruction of the University of Virginia,[238] "The concave ceiling of the Rotunda is proposed to be painted sky-blue, and spangled with gilt stars in their position and magnitude copied exactly from any selected hemisphere of our latitude." This suggestion is followed in his notebook by elaborate instructions for the building of a movable seat in which the operator, seated on a saddle at the end of an oak sapling, can be transported to any point of the concave ceiling in order to adjust the stars to their appropriate positions. The scheme of this dome, which was deliberately imitated from the Pantheon,[239] might also have been suggested to Jefferson by a recollection of Varro's Tholus with its mov-

227. Cedrenus, Ado, Nikephoros, Tzetzes.

228. See above, p. 22.

229. ". . . atque per occultas fistulas aquae meatus adducunt, ut quasi deus fluvium desuper videretur infundere: et dum subterraneo specu equis in circuitu contendentibus circumacta turris fabricata [i.e. wooden] moveri videbatur. quasi quodam modo rugitum tonituri invecta possibilitatem artificis mentiebatur."

230. See above, p. 22, note 181.

231. Cresswell, *op. cit.*, I, pp. 253 f., with bibl.; F. Saxl and A. Beer, *ibid.*, pp. 289 f. The photo reproduced here is from the collection of the late Professor R. Meyer-Riefstahl.

232. See, for example, Ch. Texier, *Byzantine Architecture*, London, 1864, pl. 57.

233. G. Thiele, *Himmelsbilder*, p. 43, fig. 7.

234. In this connection, it is interesting that F. Saxl, *op. cit.*, note 224, has shown that the representation of the dome of Quseir Amra used a convex sphere, i.e., a globe as its model.

235. W. Zahn, *Ornamente aller klassischer Kunstepochen*, Berlin, 1849, pl. 31.

236. O. Brendel, *Röm. Mitt.*, LI, 1936, p. 16.

237. I refer to the Paris Psalter (139), fol. 3v.: H. Omont, *Miniatures*, pl. 3; C. R. Morey, *Medieval Art*, New York, 1942, fig. 39. Behind Samuel anointing David, the monopteros has a vault with aegis decoration (compare Fig. 56), and on its roof between the above mentioned consoles is the heavenly sphere decorated with a disk bearing the bust of the sun. A similar structure with a sphere of light between consoles on the roof appears in Cod. Vat. Gr. 1, p. 11r. (Bratschkova, *op. cit.* [note 81], p. 28, fig. 13, pp. 52, 127, no. 973a, with confused argument; this is clearly a permanent structure like the others in the picture and not a "baldachino"; the inner dome is not decorated with a shell with "Schloss oben," but, of course, with a hemispherical pattern of the canopy variety; that these structures are "Hellenistic" is by no means certain). See also *ibid.*, p. 52, fig. 37.

238. P. A. Bruce, *History of the University of Virginia 1819–1919*, New York, 1920, I, p. 270 (from Jefferson's notebook).

239. Jefferson read Dio Cassius. See above, p. 22.

ing stars.[240] However that may be, it is again the result of the meeting of an antique architectural form, inherently symbolical in character, with a scientific spirit, belonging in this case to our own world.

Looking back on this sequence of domes of heaven and on their reflections in other ceilings and pavements in Roman and post-antique art, we note the fact that they are limited to three functional environments: villas and palaces, baths, and rather infrequently, tombs. This seems quite appropriate from the point of view of the coördination of intellectual factors and the functions of buildings: cosmic speculation and the fashionable astrological interest of Roman society were centered in private life in the villas; and in public life in the lecture halls of the Roman and Byzantine thermae, which succeeded the Greek gymnasia. The growing religious interest in astrological creeds and the related astral glorification of the emperor and the deceased explain the use of such domes in palaces and tombs. But there is another side to this question. Within the Roman world, domed constructions are limited almost without exception to the three environments of thermae, villas and palaces, and tombs. The Pantheon, as part of the Thermae of Agrippa, was no exception, whatever its religious character may have been. And, as is well known, the limitation of the dome to memorial edifices, which were connected with the realm of the tombs, and to baptisteries, which are related to the baths, continued during the early Christian period until the fusion of the dome with the Christian basilica had been achieved. The tradition of circular tomb structures, often covered in the early period with pseudo-vaulted domes — regardless of whether or not any heavenly symbolism was originally involved — reaches far back into the prehistoric past. In Italy, it was a continuous tradition. A round form for bathrooms was known in Greece.[241] It was recommended by Vitruvius and often used for caldaria. The circular dining hall of Roman palatial residences may also have its origin in the Greek tradition of circular buildings.

In each case, therefore, the development of cupola construction can be understood as a result of such traditions of functional types of round buildings combined with the need for fireproof construction, which was particularly pressing in villas and thermae, and with the general development of vaulted construction from the late Republic on. It is questionable, however, whether sizable wooden domes like those of Varro's aviary and Nero's dining hall can be understood as a result merely of this process. The former edifice antedates any large sized dome of which we have knowledge. These structures are not substitutes for solid domed buildings. They are pioneers which prepare the way for large domed construction in durable materials. The same is true for the development of Early Christian and Islamic domes, at least in the East, where Roman vaulted construction had been used only sporadically during the Empire. It seems, rather, that the desire to have great domed halls preceded and promoted technical progress in their construction. And in view of the fact that wherever we know something about their decoration, it points to celestial symbolism, we may ask whether the latter was not at least one important factor in the development of dome construction. We may also call the reader's attention to the fact that the early occurrence of the round symbol of the canopy of heaven on ceilings (Fig. 2), although it belongs to a type of symbolic decoration which tangibly inspired the later decoration of vaults and domes, precedes by a long time any permanent domed structure of large size. Furthermore, in the earliest preserved examples of flat domes, as in the Tower of the Winds in Athens (an astronomical building) and the ceiling from Palmyra with its astrological decoration, we see a purely decorative and not a constructive use of the dome motif. All these facts point to the considerable importance of celestial symbolism in the Roman development of domed construction. On the other hand, we may also ask whether the bold introduction of domes — invariably decorated with heavenly visions — in the Christian basilica is merely a problem of construction and space rendering, as proposed in evolutionary theories of the history of architecture. At least one driving force may have been the firmly established symbolism of the dome as a celestial hemisphere.

However that may be, certain types of construction exist in ancient central plan buildings which require more specific attention in connection with the observations presented in this paper. The earliest of these types is the concave conical roof. It was known in the time of Alexander the Great in the monument of Lysikrates in Athens, and shortly afterwards, in the Arsinoeion in Samothrace.[242] It seems to have been a widespread Hellenistic form and it occurs not infrequently in Pompeian paintings (Fig. 67). Sagging downward in outline, it is clearly derived from the idea of a tent or canopy. To illustrate this relationship we may refer to the actual appearance of such canopies in Roman representations (Fig. 28). Though one might suspect a connection not only with canopies in general, but also with the symbolism of the celestial canopy[243] which we saw so widely used on ceilings, it is not yet possible to establish any evidence for such a connection. In any case, this form of roof, which in a tomb in Termessos[244] is combined with a flat

240. See above, note 173.

241. Rivoira, *op. cit.*, pp. 35 f.

242. *A.J.A.*, XLIV, 1940, p. 338. I noted an apparently Hellenistic Etruscan example in the Museum of Villa Giulia, Room VIII, case 3, in a clay model of a nymphaeum which has a grotta-stone frame around the arched door and, on the opposite side, a projecting water reservoir of the type found in the Tower of the Winds.

243. See above, pp. 9 f.

244. St. Lanckorónski, *Städte Pamphyliens und Pisidiens*, II, Vienna, 1892, pl. 17.

ceiling, is not compatible with actual domed construction. It belongs to a preceding age. But it is in exactly this respect that its relationship to the canopy is interesting, since within the framework of domed construction, another type, the melon cupola, originated in Imperial architecture.[245] Its form is characterized by the outward curving of single sections of the dome, either all of them, or half of them in alternation with the precisely spherical sections. As far as we can see, the scheme first occurs in the Hadrianic age, though it too may have earlier antecedents in the first century A.D. Its relation to the wind-blown canopy with curved edges and radial units (Figs. 5, 10, 25, 26, 27, 28, 29, 35, 42, 54, 62) is evident.[246] It is transferred from the decorative symbolism of the canopy of heaven to actual structural and plastic form. It survives in the Byzantine cupolas of SS. Sergius and Bacchus and the Kahrie Djami, as well as in Early Islamic art.[247] Its explicit explanation seems to be furnished by a Byzantine writer referring to a Roman structure in Gaza, "its center was a blown up cupola extended into the heights."[248]

In both the pagan and Christian worlds, the manifold visions of the dome of heaven, with their symbolism in canopies, figures, and structural forms, with the projections of heaven on ceilings, often coupled with an actual or supposed opening in the sky, all reflect the basic experience of man in visualizing the physical as well as the transcendental celestial realm. It is evidently because of this ever increasing tradition of heavenly visions on ceilings that *coelum* became a common term for roof or ceiling in late antique speech.[249] It is not common usage in earlier antiquity. The term *caelum* occurs only once in classical Latin in this sense. Vitruvius casually speaks about the suspension of a stucco vault under a roof. He may well refer to a flat cupola (VII, 3,3). The use of the term *hemispherium* for cupola, which continues later on, also appears in Vitruvius (V, 10,5). This term, though it may originally have been merely descriptive of the form of a dome, suggests an analogy with the cosmic structure of the heavens.[250] According to the writers of the Middle Roman Empire whom Servius used (*Ad Verg., Aen.*, 1,505), the roof of central plan buildings was called *testudo* in allusion to its external appearance; and the roof was built to resemble the heavens ("ut simulacro coeli imaginem reddat"). This was the intellectual background parallel to the monumental tradition from which Byzantine writers derived their conception of the domical vision of heaven. Thus, Mesarites describes the central dome in the Church of the Holy Apostles in Constantinople, ". . . the other central hall emerges and its direction is towards heaven. It seems to me that it calls towards it the heavenly God-Man, to come down, and through it, as it were from heaven, to look down, again, on all the sons of men. . . . I say, indeed, one can see him . . . emerging from his navel through the canopy in the summit of the sphere. . . . This sphere of the hall is truly celestial, inasmuch as within it the sun of justice is erected, the light beyond light, the Lord of Light, Christ."[251] The vision of a directing spirit of the world, the source of physical, moral, and spiritual light, in the image of the Pantokrator on the celestial dome is here the source of faith and revelation. The downward movement of the heavenly Savior toward the sons of men is a new and Christian activation of the ancient contemplative and speculative visualization of gods, stars, elements of nature, and cosmic energies. In art, this Byzantine revelation found its most explicit expression in the representation of Pentecost in dome mosaics (Fig. 68).[252] There the rays of the light of inspiration shoot down in radiating lines from the throne erected in the center of the ethereal canopy of heaven. The idea that this revelation should be communicated from heaven through a domed structure is illustrated in naïve form in a Carolingian miniature (Fig. 69).[253]

245. Examples: Rivoira, *op. cit.*, pp. 130 f.; K. Lehmann-Hartleben and J. Lindros, *Opuscula archaeologica*, I, 1935, pp. 197 f. Tor de Schiavi is one of these domed structures and not merely an apse. It makes no sense to call its decoration a shell and there is certainly no "Schloss" above (Bratschkova, *op. cit.*, pp. 44 f., fig. 31, p. 71, no. 59).

246. If the lines of such cupola interiors be projected on a plane various patterns of the canopy type emerge, like those occurring in our decorations. The dome of the Tempio di Siepe (Rivoira, *op. cit.*, fig. 152) shows a combination of an eight sided canopy with a central circle and four smaller "eyes" similar to Fig. 27. A strange bell-shaped variety occurs in the vault of an early Imperial tomb in Pompeii (third style) and shows a decoration with stars and a central disk: Mazois, *Ruines de Pompéi*, I, Paris, 1824, pl. 28, fig. 5; pl. 29, fig. 5.

247. See Cresswell, *op. cit.*, II, 1940, *passim*.

248. Marcus Diaconus, ed. Bonn, p. 62, 5 f.; see H. Grégoire, in Cresswell, *op. cit.*, I, p. 84: "Τὸ δὲ μέσον αὐτοῦ ἦν ἀναφυσητὸν κιβώριον καὶ ἀνατεταμένον εἰς ὕψος." For the later church use of the term *ciborium*, see J. Braun, *op. cit.*, II, pp. 185 f. It was originally a craftsman's term describing the form of a "cup," and it corresponds here in its meaning to the Latin *cupola* used in antiquity in North African inscriptions for vaulted tombs (*Thesaurus linguae Latinae, s.v.*). For further connection of the altar ciborium with the canopy of heaven, see the Vision of Isaac, Braun, *op. cit.*, pp. 194 f. The terms καταπέτασμα and παραπέτασμα which also occur in Byzantine Greek for such structures, both refer, of course, to their character as canopies, which A. Heisenberg, *Grabeskirche und Apostelkirche*, Leipzig, 1908, I, p. 119 and II, p. 81, failed to recognize in a rather confused discussion. Unfortunately, no Early Christian ciborium has preserved its ceiling.

249. For bibl. see Wilpert, *Mosaiken*, I, p. 55.

250. I may recall at this point the great astronomical and astrological interest on the part of professional architects which is evident in Vitruvius' long discussion, *De arch.*, IX, 1 f.

251. Heisenberg, *op. cit.*, II, pp. 28 f.

252. Fig. 64, Venice, San Marco: Demus, *S. Marco*, fig. 2. Compare Hosios Lukas: E. Diez and O. Demus, *Byzantine Mosaics in Greece*, Cambridge, Mass., 1931, color pl. 5, p. 15, fig. 7; and, for the iconographic tradition: J. Baumstarck, *Oriens Christianus*, IV, 1904, pp. 123 f., 140 f.

253. Paris, Bibl. Nat., Lat. 1428, Sacramentary of Drogo: A. Bonnet, *La miniature carolingienne*, Paris, 1913, pl. 88.

ABOUT A TYPE OF ISLAMIC INCENSE BURNER

MEHMET AGA-OGLU

INCENSE burners were no novel vessels produced to meet the specific needs of Islamic social life. The origin of thurification with various aromatic substances for magical, religious, or social occasions, and the devising of special vessels for the purpose, go far back to the historical beginnings of the Near Eastern peoples.[1] Islam, although in principle opposed to luxurious ways of life, did not prevent the use of incense and perfumes. The popularity of perfumes during the first centuries is best illustrated by the lengthy legistic opinions expressed in the *Hadith* literature,[2] and, among others, by a chapter in the manual for elegant manners "of a man of polite education," written by Abu'l-Tayyib Muhammad ibn Ishaq al-Washsha.[3]

Historical sources are extremely generous with accounts on the subject.[4] A few examples can be cited here, and others will be presented elsewhere. According to a descriptive account by al-Mas'udi, the 'Abbasid caliph, al-Ma'mun (198/813–218/833), presided over an assembly of legists every Tuesday. When these and other learned men came to the palace to attend these meetings, they were first ushered into a chamber and served a meal, after which the incense burners were brought so that the guests could perfume themselves before entering the caliph's presence.[5] The amount of aromatic substances, particularly aloes and certain varieties of sandalwoods, used for thurification in the households of caliphs and dignitaries, must have been enormous. We are informed by al-Tabari, for example, that Amr ibn al-Laith, the founder of the Saffarid dynasty of Eastern Iran, sent to Caliph al-Mu'tamid in the year 268 (881/82) 200 minas of aloes wood which he had confiscated from a grandson of Abu Dulaf.[6] Among the properties left after his death in 301 (913), by Abu'l-Husayn Ali ibn Ahmad al-Rasibi, the 'Abbasid governor of Khuzistan and neighboring territories, were great numbers of gold and silver vessels, perfumes, and other valuables, as well as 4,420 *mithkals* of aloes wood for thurification.[7]

Thurification was, however, not confined to the audience halls of caliphs, kings, and their dignitaries, or to the drawing rooms and private chambers of urban aristocracy. An important account by the early tenth-century geographer, Ibn Rustah, suggests that religious institutions were likewise incensed, apparently under the influence of Christian church practice. Our authority relates how the orthodox caliph, 'Umar, presented to the mosque at al-Madina a silver incense burner ornamented with human figures which was brought by him from Syria.[8] More than five centuries later the famous Spanish traveler, Ibn Jubayr, describes a religious ceremony during the month of Ramadan in a mosque at Mekka which was perfumed with aloes wood from a censer.[9]

1. See the exhaustive article by Fr. Pfister, "Rauchopfer," in Pauly-Wissowa, *Real Encyclopädie der classischen Altertumswissenschaft*, Zweite Reihe, I, cols. 267 ff. For ancient Egypt, Mesopotamia, and Palestine, numerous references will be found in J. R. Partington, *Origin and Development of Applied Chemistry*, London, 1935, pp. 146 f., 306, and 515 ff. This extremely useful book contains some 25,000 references. Hence, many errors, as the author himself recognized, were inescapable, and therefore it must be consulted with great caution. Regarding various incenses known to pre-Islamic Iran, consult Bundahishn, transl. by E. W. West, *The Sacred Books of the East, V, Pahlavi Texts*, Part I, Oxford, 1880, pp. 102 f., chap. XXVII, 19; see also B. Laufer, *Sino-Iranica*, Chicago, 1919, p. 193. For the Islamic periods valuable information will be found in the respective chapters of the twelfth volume of al-Nuwayri's *Nihayat al-'Arab fi Funun al-Adab*, Cairo, 1937.

2. A. J. Wensinck, *A Handbook of Early Muhammadan Tradition*, Leyden, 1927; see under "perfume."

3. *Kitab al-Muwashsha*, ed. R. E. Brünnow, Leyden, 1886, chap. 26, pp. 125 f.

4. Highly important in this connection is the observation of the great Islamic sociologist-historian, 'Abd al-Rahman ibn Khaldun, *Muqaddima*, ed. E. M. Quatremère, Paris, 1848, II, pp. 265,17 f., who places the use of perfumes among the higher arts employed by the luxurious urban society.

5. *Muruj al-Dhahab wa Ma'adin al-Jawhar*, ed. B. de Meynard and P. de Courteille, Paris, 1861–77, VII, pp. 38,9 f.

6. *Ta'rikh al-Rusul wa'l-Muluk*, ed. J. de Goeje *et al.*, Leyden, 1879–1901, ser. 3, VII, p. 2018,4.

7. Yaqut, *Mu'jam al-Buldan*, ed. F. Wüstenfeld, Leipzig, 1866–73, II, p. 617,20; see also B. de Meynard, *Dictionnaire géographique, historique et littéraire de la Perse*, Paris, 1861, pp. 204 f., and A. von Kremer, *Culturgeschichte des Orients unter den Chalifen*, Vienna, 1875, II, pp. 209 f.

8. *Kitab al-A'laq al-Nafisa*, ed. J. de Goeje, Leyden, 1892, p. 66,15.

9. *Rihlah*, ed. J. de Goeje, Leyden, 1907, p. 151,13; also the

The lavish use of incense and perfumes was not without influence upon the commercial activities of the Islamic peoples. Since earliest times trade in incense was an important branch of overseas commerce. Aloes, sandalwoods, and other aromatic substances were extensively imported from India, the East Indies, and Africa,[10] not only for interregional trade, but also for transshipment to European markets.[11] During the entire mediaeval period, the principal cities of the Islamic world possessed special Markets of the Perfumers (*Suq al-'Attariyin*),[12] well supplied with great varieties of fragrant oils and essences, as well as with all kinds of aromatic woods, herbs, and gums.

These few historical accounts will suffice to indicate the place of incense in the Islamic social and religious structure during the mediaeval centuries, and consequently to determine the scope of the contribution made by industrial arts in providing the necessary utensils to meet this specific requirement. Historical literature records that Hamadan was one of the centers prominent in the production of incense burners in the early tenth century. Ibn al-Faqih, describing the industries of that city, asserts that "The people of Hamadan are especially skilled in the manufacture of (metal) mirrors, spoons, incense burners, and gilded kettle drums."[13] Corresponding to the wants of various strata of cultured societies, the incense burners, called in Arabic *mijmar*, in Persian *ud-suz*, and in Turkish *bukhurdan*,[14] display in greater or lesser degree the artistic trends of the periods to which they belong, and are among the notable decorative objects bequeathed to us from the past.

E. Kühnel merits the distinction of being the first to call our attention to the fact that the shape of these incense burners with cylindrical bodies and domed covers is related to similar vessels found among the preserved Coptic bronzes.[15] The striking similarity between the Coptic examples and the Islamic pieces is evident, and suggests their common origin beyond any doubt. The Coptic incense burner, formerly in the collection of D. Fouquet and now in the Staatliche Museen in Berlin (Fig. 1), is sufficiently indicative in this regard. Of bronze and 16 cm. high, its body and cover are entirely in openwork, the body being formed of uninterrupted vine scroll and the cover having five rosettes containing radiating leaves. The knob is surmounted by an eagle and a wooden handle was originally inserted in the short tube attached to the body.[16] The exact date of this and other Coptic pieces of the group is difficult to determine with certainty. J. Strzygowski assigned the

translation by C. Schiaparelli, *Ibn Gubayr. Viaggio in Ispagna, Sicilia, Siria e Palestina, Mesopotamia, Arabia, Egitto*, Rome, 1906, p. 181.

10. Abu Zayd Sirafi, *Silsilat al-Ta'warikh*, ed. J. T. Reinaud, Paris, 1845, p. 30,7, and al-Idrisi, *Nuzhat al-Mushtaq fi Ikhtiraq al-Afaq*, transl. P. A. Jaubert, Paris, 1836–40, I, p. 51.

11. W. Heyd, *Histoire du commerce de Levant au moyen-âge*, Leipzig, 1923, II, pp. 563 f. and 581 ff.; also A. Schaube, *Handelsgeschichte der romanischen Völker des Mittelmeergebiets bis zum Ende der Kreuzzüge*, Munich and Berlin, 1906, pp. 187, 197, and 315 f.

12. For Baghdad see G. Le Strange, *Baghdad during the Abbasid Chaliphate*, Oxford, 1924, p. 272; for Istanbul, Ewliya Chelebi, *Siyahat-Nameh*, Istanbul, 1896, I, p. 599.

13. *Kitab al-Buldan*, ed. J. de Goeje, Leyden, 1885, p. 253,19: اهل همذان خاصة حذق باتخاذ المرايا والملاعق والمجامر والطبول المذهبة

14. Another frequently used Arabic term is *mabkhara*. Historical references about these terms for incense burner will be found in the special chapter devoted to the glossary of Islamic metal objects in the first volume of my forthcoming *Corpus of Islamic Metalwork*. In this connection I would like to make a note of caution regarding the matter of Islamic terminology. R. Ettinghausen in his recently published article, "The Bobrinski 'Kettle,' Patron and Style of an Islamic Bronze," *Gazette des Beaux-Arts*, XXIV, 1943, pp. 194 f., pertinently reiterates the fact that vessels like that of the former Bobrinski collection are not "kettles," but buckets. As a matter of recognition it should be noted that the Bobrinski piece was already called a *seau* by G. Wiet over a decade ago ("L'exposition d'art persan à Londres," *Syria*, XIII, 1932, p. 78) and in the guidebook of the oriental department of the State Hermitage (*Putevoditel' po zalam vostoka*, Leningrad, 1939, p. 121) the same and identical bronze objects are termed *satl*, which is a correct word for this type of bucket. The Arabic term *satl* has been defined, for example, by the eleventh-century lexicographer, al-Zamakhshari, in his *Muqaddimat al-Adab*, ed. J. G. Wetzstein, Leipzig, 1840, p. 28,18, as a vessel used in the hot bath. *Barniyya*, suggested by R. Ettinghausen, *op. cit.*, p. 195, is something else. In mediaeval Arabic this word signified a glazed or unglazed pottery vessel, and even, according to some authorities, a flask or bottle of glass. Reserving further discussion of these terms for the *Corpus*, in the meantime reference can be made to the readily accessible E. W. Lane's *Arabic-English Lexicon*, London, 1863, I, p. 196, or to the Arabic-Turkish dictionary, *Akhtar-i Kebir*, Istanbul, 1324/1906, I, p. 131, composed in the year 1545 by Mustafa ibn Shams al-Din Qara-Hisari. In both these dictionaries the exact definitions of *barniyya* are given in accordance with the opinions of classical lexicographers.

15. "Islamische Rauchergerät," *Berliner Museen. Berichte aus den preuszischen Kunstsammlungen*, XLI, 1920, col. 242.

16. O. Wulff, *Altchristliche und mittelalterliche byzantinische und italienische Bildwerke*, Berlin, 1911, I, pp. 205 f., no. 980, pl. XLVI. For further Coptic incense burners of this type see J. Strzygowski, *Koptische Kunst. Catalogue général des antiquités égyptiennes du Musée du Caire*, Vienna, 1904, p. 283, no. 9118, pl. XXXII, and E. Kühnel, *op. cit.*, fig. 89.

There is in the museum of the German Campo Santo in Rome an incense burner which is believed to be of Coptic origin. It has a simple, cylindrical body devoid of any ornamentation, resting on three feet, with cover attached by a hinge. The cover is perforated and is crowned by a seated dove. The upper rim of the body has three loose rings to hold the chains which are missing. Thus the piece is related to the well-known hanging thuribles, although its shape is similar to those with handles; see F. Witte, "Thuribulum und Navicula in ihrer geschichtlichen Entwicklung," *Zeitschrift für christliche Kunst*, XXIII, 1910, cols. 109 f., fig. 111.

A related incense burner, probably of German workmanship, fashioned after an Eastern prototype, is in the collection of antiquities in the Schloss at Mannheim. Its cover is, however, differently shaped and has perforated round medallions with christmon. Originally it also hung from a chain. J. Lessing, "Frühchristliche Weihrauchfässer," *Jahrbuch der königlich preussischen Kunstsammlungen*, II, 1881, pp. 89 f., fig. 1; also Ch. Rohault de Fleury, *La messe. Études archéologiques sur ses monuments*, Paris, 1887, V, pp. 153 f., pl. CDXV.

similarly shaped piece in the Cairo Museum to the Islamic period without suggesting a particular century,[17] and O. Wulff in his description of the piece presented here was content in offering no date at all.[18] One can be certain, however, that such incense burners were popular among Copts since the pre-Islamic period, and were still produced for some time after the conquest of Egypt by the Arabs.

This particular type of incense burner was also known to Byzantine ecclesiastic art of the early Middle Ages. The Staatliche Museen in Berlin possess such a piece, unmistakably Byzantine in origin (Fig. 2).[19] It measures 23.5 cm. in height and is cast of bronze. Both the cylindrical lower part and the dome-shaped cover are formed in openwork of repeated semicircular double arches. The knob, the straight handle ending with a dragon's head, and the three feet attached to the body from the side are devoid of any particular ornamentation. As far as I am aware, this piece is the only known Byzantine incense burner of its kind. But this circumstance does not preclude the possibility that the type was equally as popular as that of the hanging thuribles.[20] The number of preserved monuments of Byzantine ecclesiastic furniture belonging to the period before the year 1200 A.D. is very small. The reason for this, most certainly, is that they were for the greater part made of silver, and consequently perished in the hands of Western and Eastern invaders during the centuries-long decline of the Byzantine Empire. One should recall, for example, the fate of the silver plate of Bishop Paternus, found among the Sasanian gold vessels near Poltava,[21] or of the silver plate with two angels flanking a cross, found in the Gouvernement of Perm in Siberia,[22] to realize how the objects of Eastern Christian ecclesiastic art were scattered all over the Eurasiatic continent. Islamic historical accounts about the looting of Christian art treasures in Syria, Anatolia, Armenia, and elsewhere, are illuminating in this regard; so are the statements of Byzantine and Armenian annals.[23]

E. Kühnel has already suggested that the shape of these Coptic incense burners seems to have been carried as far as Iran.[24] In this connection, attention is invited to an historical event so far not evaluated by the students of Islamic art; namely, the presence of Coptic settlers in Mesopotamia. We are informed by a great number of historical statements that after the revolt of the Copts against the Egyptian administration in the year 214 (829), the rebels were severely punished by the 'Abbasid general, Afshin, and the survivors, together with their families, were evacuated to 'Iraq, where they were settled in the vicinity of Baghdad.[25] It should be remembered that the Copts were a people of craftsmen. There can be little doubt, therefore, that these enforced emigrants brought the traditions of various crafts to 'Iraq with them and were not without some effect upon the formation of the Islamic art of the early 'Abbasid period. Similarly it is not impossible that the type of Iranian incense burner, which will presently be considered in brief, was introduced by these Coptic settlers and later carried to such artistic centers as al-Rayy and Shapur, which are the provenances of two pieces of considerable interest.

The first, and certainly the earlier of the two, is the incense burner unearthed by the French archaeological expedition at Shapur.[26] The history of the city after its conquest by the Arabs offers a basis for the approximate dating of the piece. An old Sasanian settlement, Shapur (Bishapur, or Sabur of early Arab geographers) was occupied by Arab conquerors in the year 16 (637). It remained side-tracked, however, by rapidly developing events, mostly because of the growing administrative and economic importance of the neighboring city of Kazirun and the newly founded Islamic military camp at Shiraz. Once considerably famed as a center of the perfume and textile industries, Shapur, according to the account of al-Maqdisi,[27] was in the process of decline during his time (the first decades of the tenth century) with its suburbs already in ruins. Half a century later, toward the end of Buwayhid rule, the city was destroyed by Abu Sa'd ibn Muhammad ibn Mama, the chieftain of the powerful Kurdish Shabankara tribe. Although we are informed by Ibn al-Balkhi, the geographer of the first half of the twelfth century, that the Seljuq administration endeavored to restore the devastated city, it seems more probable that these efforts were never successful. The city

17. *Loc. cit.*

18. *Loc. cit.*

19. O. Wulff, *op. cit.*, II, p. 93, no. 1983, pl. XVI.

20. For Byzantine and Coptic examples of such thuribles, see O. M. Dalton, *Catalogue of Early Christian Antiquities and Objects from the Christian East in the British Museum*, London, 1901, p. 87, no. 399; A. B. Tonnochy, "The Censer in the Middle Ages," *The Journal of the British Archaeological Association*, ser. 3, II, 1937, pp. 46 ff.; E. von Mercklin, "Aus der Antikenabteilung im Hamburgischen Museum für Kunst und Gewerbe," *Archäologischer Anzeiger. Beiblatt zum Jahrbuch des deutschen archäologischen Instituts*, LV, 1940, pp. 62 f., figs. 55–60, and J. D. Cooney, *Late Egyptian and Coptic Art. An Introduction to the Collections in the Brooklyn Museum*, New York, 1943, p. 19, no. 34.

21. Graf A. Bobrinskiĭ, "Pereshchipinskiĭ klad," *Materialy po arkheologii Rossii*, Petrograd, 1914, pp. 111 and 117, pl. I.

22. Ya. I. Smirnov, *Vostochnoye serebro*, St. Petersburg, 1909, p. 9, pl. XV, no. 38, or Ch. Diehl, *Manuel d'art byzantin*, Paris, 1925, I, pp. 316 f., fig. 160.

23. Some of these accounts are of particular interest for the study of Islamic metalwork and will be presented in the *Corpus*. References here can be made to the passages of the tenth-century Armenian historian, Moses Kalankatvasi, *History of Aghwankh*, ed. G. Shahnazarian (in Armenian), Paris, 1860, pp. 125 f. and al-Tabari, *op. cit.*, ser. 3, VII, pp. 2103,4 f.

24. *Op. cit.*, col. 244.

25. For historical sources see *The Encyclopaedia of Islam*, II, p. 994.

26. R. Ghirshman, "Les fouilles de Châpour (Iran)," *Revue des arts asiatiques*, XII, 1938, p. 13, pl. IX, 5.

27. *Ahsan al-Taqasim fi Ma'rifat al-Aqalim*, ed. J. de Goeje, Leyden, 1877, p. 432,15.

remained forever in ruins.[28] The incense burner in question, therefore, must be a work of a period not later than the first half of the eleventh century.

Made of bronze in a pan-like shape with three feet and a long handle, it has a semispherical cover surmounted by a figure of a standing bird (Fig. 3). The only ornamental decoration of the piece consists of engraved circlets with inserted dots. These are arranged both in triangles and in a row. It is conspicuous that this simple motif is one of the most characteristic designs of Coptic art, examples of which are numerous.[29] To mention only a few, attention can be called to the bronze incense burner in the Dumbarton Oaks Collection,[30] to the bronze lamp and cross, both in the Staatliche Museen in Berlin,[31] or to the ivory box in the Museum of Fine Arts, Boston.[32] Moreover, the figure of the bird in itself recalls parallels in Coptic art. It is not my intention to attribute the Shapur incense burner to Coptic origin. Nevertheless, evidence points toward such possible derivation.

The other incense burner is the frequently published piece in the Islamic Department of the Staatliche Museen in Berlin (Fig. 4), which is said to have been found in the ruins of al-Rayy,[33] and is probably a work of the early twelfth century. This piece, of heavy appearance is cast of bronze, with a low, cylindrical body resting on three feet, and a long, perforated handle. The dome-shaped cover with four arched apertures is crowned with a harpy, the tail of which ends in a dragon, which in turn twists and curves upward to attack the head of the harpy. The drop-like bosses of the body are very characteristic of a group of mediaeval Islamic mortars and seem to have been known to the Iranian art of metalwork in earlier centuries.[34]

The same museum possesses another pan-like incense burner, the cover of which is missing. It shows the same drop motifs, and has a long handle ending in the figure of a lion standing on his hind legs and facing inward.[35] This peculiar Hellenistic theme makes us place the piece in a period even earlier than that of al-Rayy.

While the examples from Shapur and al-Rayy show close affinity to the Coptic pieces, the incense burners to which this paper is devoted form a group of markedly different features. It should first be noted that this particular group seems to have been a Syro-Mesopotamian specialty which was introduced to Iran on one hand, and to Mamluk Egypt on the other. So far, no definitely authenticated pre-Mamluk Egyptian piece has been known. A bronze incense burner with engraved inscriptions, interlaced bands, and perforated medallions, seen by E. Kühnel in the year 1913 in the art market and published by him as belonging "zweifellos der Fatimidenzeit Ägyptens um 1100,"[36] needs re-examination. But unfortunately the present ownership of this piece is unknown, and the reproduction in E. Kühnel's article (Fig. 5) does not show the ornamentation in sufficient clarity to make a comparative study possible. The technique of the decoration and the type of ornamental motifs alluded to are in themselves not criteria for attributing the piece to the Fatamid period of Egypt. Judging from the shape, one is inclined to place the piece in the thirteenth century and to classify it as a work of North Mesopotamian or Syrian origin. There is, indeed, a distant relationship between this piece and Coptic incense burners, but they differ from each other considerably. It should be observed that the Coptic pieces always have low bodies (with the feet included) and proportionately larger covers. On the other hand, the proportions between these parts of the Islamic incense burners is quite the opposite; namely, their bodies are invariably larger than their covers. This, it should be underlined, constitutes a marked characteristic of the Is-

28. *Fars-Name*, ed. G. Le Strange and R. A. Nicholson, London, 1921, p. 142,17. I am inclined to accept the opinion of V. F. Büchner ("Shapur," in *The Encyclopaedia of Islam*, IV, p. 317) that the city never rose after its destruction. In the article by G. Salles and R. Ghirshman, "Chapour. Rapport préliminaire de la première campagne de fouilles," *Revue des arts asiatiques*, X, 1936, p. 117, it is said that the city was destroyed "à la fin de la dynastie bouride"; to avoid confusion the name of the dynasty should be corrected to Buwayhid.

29. E. Diez, "Bemalte Elfenbeinkästchen und Pyxiden der islamischen Kunst," *Jahrbuch der königlich preussischen Kunstsammlungen*, XXXI, 1910, p. 232. This simple motif occurs on a great many objects almost everywhere in Islamic countries. As an example, mention can be made of a bronze padlock dated 541 (1146/47) and signed by Abu Bakr ibn Ahmad, found in the ruins of the ancient city of Wolga-Bulghars, Bilar (later called Bilyarsk), see S. Malov, "Zamok iz Bilyarska s arabskoĭ nadpis'yu," *Zapiski Kollegii Vostokovedov pri Aziatskom Muzeye*, II, 1927, pp. 155 ff.

30. *Pagan and Christian Egypt. Egyptian Art from the First to the Tenth Century A.D.*, Brooklyn Museum, 1941, p. 33, no. and fig. 87.

31. O. Wulff, *op. cit.*, I, pls. XXXIII, no. 798, and XLIV, no. 944.

32. *Pagan and Christian Egypt*, p. 98, no. and fig. 98. For further examples see J. Strzygowski, *op. cit.*, pls. VIII, no. 8831; XIX, nos. 8906, 8907, and XX, nos. 8922, 8929, 8951; also O. Wulff, *op. cit.*, pls. XIV, no. 351; XXV, no. 548; XXX, no. 693, and others.

33. E. Kühnel, *op. cit.*, col. 244.

34. The "drop" motif occurs on a cast bronze bulb found in Tal-i Zohak (district of Fasa, Iran), published by the late Sir Aurel Stein, "An Archaeological Tour in Ancient Parsis," *Iraq*, III, 1936, p. 140, pl. XXIX, 34. The same motif also decorates a very important but little-known bronze ewer of traditional Sasanian shape in the Museum of Fine Art of the Ukrainian Academy of Science in Kiev. See M. Vyaz'mitina, *Mistetztvo krayin Islamu. (Muzeĭ Mistetztva Vseukrayins'koyi Akademii Nauk*, Kiev, 1930), p. 71, no. 389, pl. XI. It is of interest to observe that the "drop" motif was employed in stucco carvings of Sabz Pushan near Nishapur, belonging to the latter half of the tenth century. See W. Hauser, "The Plaster Dado from Sabz Pushan," *Bulletin of The Metropolitan Museum of Art*, Section II, XXXII, 1937, p. 23, fig. 30.

35. E. Kühnel, *op. cit.*, col. 244, fig. 94. A Coptic stand for a lamp in the British Museum has as its feet three lions standing on their hind legs and facing the baluster stem. See O. M. Dalton, *op. cit.*, p. 100, no. 496, pl. XXVI.

36. *Op. cit.*, col. 242.

lamic incense burners of the type, and also, as a matter of fact, of the Byzantine piece already presented. Thus it would seem more likely that the Islamic craftsmen adopted the type, not from the Coptic art of Egypt, but rather from the ecclesiastic art of southeastern provinces of Byzance, where the Christian artistic tradition was preserved and cherished for a longer period of time.

The same can also be said about the feet of the Islamic incense burners. In the first place, their peculiar shape does not find parallel among the Coptic metals. Undoubtedly derived from the zoömorphic form, they are characterized by a protruding single or double rib over the ankle. This particular detail occurs on the feet of some Islamic bronzes of diverse origin and periods,[37] and, which is very important for our thesis, on the feet of a Byzantine bronze candelabrum in the Staatliche Museen in Berlin.[38] Not only in their protruding ribs, but also in their shape, the feet of this candelabrum are very similar to those of the Islamic incense burners. Here again we have an unmistakable connecting link between Byzantine metalwork and the objects under consideration.

Of all the known incense burners of the group, a special place should be reserved for the important, but somewhat neglected, piece in the British Museum (Fig. 6). It is dated, and displays the characteristic ornamental and compositional features of North Mesopotamian (Mosul) inlaid metals, and hence is of particular interest for our discussion. The cylindrical part is decorated with three round medallions, two of which are framed by arabesque bands and filled with interlaced geometrical pattern. The third medallion was occupied by the joining end of the handle, now missing. Between these medallions and three arabesque quatrefoils runs an interrupted band of benedictory Arabic inscription. Above and below this band, amidst the T-frets, are round, eight-petaled rosettes. The decoration of the cover consists of parallel registers. The principal register, bordered by plaited, three-strand strips, has four octagonal medallions of interlaced geometric pattern, and in between, symmetrically composed arabesque devices, the background of which is perforated. Around the base of the knob is an inscription band of poetical content which ends with the statement that the piece "was made in the year six hundred and forty-one," corresponding to 1243/44 A.D.[39] The knob is decorated with a plait pattern and lancets; the joining rims of the body and cover are left plain, while that on the lower end of the body is occupied by a loosely twisted double strand with inserted beads. Finally, the feet have arabesque ornaments. There is no need to make comparisons of individual ornamental elements or their compositional treatment with those of the attested inlaid metals of the Mosul school. These are well known, and the incense burner in the British Museum has been accepted as a work of this school since its descriptive publication by Stanley Lane-Poole.[40]

To the same North Mesopotamian school and the first half of the thirteenth century the incense burner in the collection of R. Harari in Cairo (Fig. 7) unmistakably belongs. The same compositional disposition of design is likewise characteristic of this piece. On a background of T-fret pattern, the lower part is ornamented with foiled medallions containing horsemen. In between are an interrupted band of *kufi* inscription and six-petaled rosettes. The medallions on the cover enclose arabesque devices and double-headed eagles in alternation. At the base of the knob is, as is usual, a band of benedictory inscription. Aside from all other ornamental motifs, the representation of the heraldic bird is, in itself, definite testimony to the fact that the incense burner cannot be of Iranian origin, as has been intimated in a recent publication.[41] The double-headed eagle remained completely unknown to mediaeval decorative arts of Iran. On the other hand, its examples on architectural monuments and objects of industrial arts of North Mesopotamian origin are numerous.[42] Presumably an heraldic emblem of some Urtuqid and Zengid princes, it was fre-

37. Cf. H. Glück and E. Diez, *Die Kunst des Islam*, Berlin, 1925, figs. 438 and 441; H. D. Hallis, "A Unique Seldjuk Bronze," *Ars Islamica*, II, 1935, fig. 1. Fr. Sarre pointed out the similarity of these feet to the forefeet of the well-known fountain piece in the shape of a lion found in Spain (*Sammlung F. Sarre. Erzeugnisse islamischer Kunst. Teil I. Metall*, Berlin, 1906, p. 14). The protruding ribs occur also on this lion's feet, but, of course, this detail should be identified with common late Hellenistic prototypes.

38. O. Wulff, *op. cit.*, II, p. 91, no. 1978 and figure.

39. انا في باطني الجحيم ولكن ظاهري قتر رائحات اجبات عمل في سنة احد واربعين وستمائة i.e., "Within me is hell fire; but without float sweetest odours; it was made in the year six hundred and forty-one." The reading is by S. Lane-Poole, *The Art of the Saracens in Egypt*, London, 1888, p. 206, no. 2.

40. M. van Berchem, "Notes d'archéologie arabe," *Journal asiatique*, III, 1904, p. 33; G. Migeon, *Manuel d'art musulman*, Paris, 1927, II, p. 66; and G. Wiet, *Catalogue général du Musée arabe du Caire. Objets en cuivre*, Cairo, 1932, p. 173, no. 52.

There are three more incense burners of the type in the British Museum. One of these will be presented here later. Of the remaining two, one has been briefly described by S. Lane-Poole, *op. cit.*, p. 213, no. 6, according to whom the lower part is decorated with medallions filled with enthroned figures and beasts of the chase. One of these medallions is occupied by a handle. On the cover are nine seated figures holding caps, cymbals, etc., and a band of Arabic benedictory inscription. The reproduction of this and the fourth piece must await an opportune time because they have not been photographed and have been removed to a place of safety for the duration of the war. For information concerning these incense burners I am indebted to M. Basil Gray, the Deputy Keeper in charge of Oriental Antiquities of the British Museum.

41. R. Harari, "Metalwork after the Early Islamic Period," *A Survey of Persian Art*, London, 1938–39, VI, pl. 1338C.

42. See the important observations of M. van Berchem, *Amida*, Heidelberg, 1910, pp. 97 ff., where the literature on the subject has been discussed. Cf. also Fr. Sarre, "Ein orientalisches Metallbecken des XIII Jahrhunderts im Königlichen Museum für Völkerkunde zu Berlin," *Jahrbuch der Königlich preussischen Kunstsammlungen*,

quently employed in stylized renditions to decorate the inlaid metals of the thirteenth century. One of these renditions shows the bird with lanceolate, shield-like breast, outstretched legs showing two talons, and widespread wings, the outer plumes of each curving upward and carrying an animal head.[43] Exactly such double-headed eagles decorate the incense burner in the R. Harari Collection. It should be noted that the upper part of the knob of this piece has been broken off, but in its original form it was most probably identical with the knobs of those pieces which are recognized here as being of North Mesopotamian or Syrian origin.[44]

Of noteworthy cultural, as well as artistic significance is another incense burner in the British Museum (Fig. 8). It belongs to the small, well-known group of Syro-Mesopotamian Islamic metals decorated with Christian figural subject matter. Both the lower part and the cover are inlaid with rows of compartments with foiled, pointed arches and loop-like partitions in which, against a background of arabesque scrolls, stand aureoled Christian personages (saints) in various postures, holding beakers, staves, and so forth. This subject matter in identical composition is known from a candlestick in the Musée des Arts Décoratifs, which, according to the inscription, was made in the year 646 (1248/49) by Dawud ibn Salama of Mosul.[45] Another piece displaying the same decoration is the silver-inlaid bronze plate formerly in the collection of L. M. Belinko, now in the State Hermitage.[46]

This particular type of compartment is a motif which was frequently employed by the North Mesopotamian metal workers of the thirteenth century. A few examples may be considered. It appears on the neck of the ewer by Ali ibn 'Abd Allah al-'Alawi of Mosul,[47] and on the upper part of a candlestick in the Metropolitan Museum.[48] Moreover, the motif determined the shape of some North Mesopotamian candlesticks. The concave middle sections of the small octagonal candlestick in Çinili Köşk Müzesi in Istanbul[49] and of two more pieces, one in the State Hermitage[50] and the other in the Museo Civico in Turin, are formed of such compartments with loop-like partitions.

This is not the place to discuss in detail the origin and the development of this motif. It was known and effectively employed in Mesopotamian art of the 'Abbasid period. The stucco wall decorations in Samarra made use of it in a number of variations as a principal element of all-over pattern. There the motif is found within the so-called first style and was rendered as a strongly undulating band, the upper curved parts of which are trefoiled while the lower are left rounded.[51] In later centuries we find the motif on architectural monuments in Iran, both in stucco and stone carvings, as well as in brick composition. The earliest recorded examples, to my knowledge, are found in Ghazna, and belong to the eleventh century.[52] They are very similar to those employed in Samarra. But the majority of Iranian examples represent a slightly modified form. This difference consists in the drawing together of the connecting bands between the trefoiled upper and rounded lower sections. By so doing, the originally undulating band is transformed into trefoil-arched compartments with loop-like partitions. In such form it occurs in the interior of Masjid-i Jum'a in Qazwin, built between the years 500 and 509 (1106–15),[53] and again on the brick minaret of the

XXV, 1904, pp. 64 ff. For the Mamluk examples consult L. A. Mayer, *Saracenic Heraldry*, Oxford, 1931, pp. 9 f., pl. III.

43. This particular type with some variations was employed also in the neighboring countries, Anatolia and Syria. From the former we possess a magnificent example in the gold brocade in the Apollinari Shrine in Siegburg (see O. von Falke, *Kunstgeschichte der Seidenweberei*, Berlin, 1913, fig. 163) and from the latter, the enameled glass beaker once in the Spitzer Collection (reproduced by E. Garnier, "La verrerie," in *La collection Spitzer*, Paris, 1891, III, pp. 81 and 90, pl. II). On North Mesopotamian metals the outer plumes of eagles' wings, after interlacing under the tail, are sometimes terminated with animal heads. For an example, see the candlestick in Fr. Sarre, *Erzeugnisse islamischer Kunst*, p. 13, no. 20, fig. 13. There is a thirteenth-century North Mesopotamian salver in the British Museum on which the double-headed eagle carries, in addition to the animal heads, busts of bowmen on the upward-curved tips of its tail plumes. The salver has been briefly discussed by S. Lane-Poole, *op. cit.*, p. 214, no. 7, but without exact description of the double-headed eagle. It can be seen, however, on the postcard, *Serie XVIII*, no. 7, issued by the British Museum.

Another interesting North Mesopotamian variant is the combination of this heraldic bird with the representation of the moon. This occurs on a bronze plaque in the Musée du Louvre, reproduced by G. Migeon, *Musée du Louvre. L'orient musulman*, Paris, 1922, p. 14, no. 39, pl. 14; and on a small candlestick in Çinili Köşk Müzesi in Istanbul; see M. Aga-Oglu, "Islamische Metallarbeiten aus Istanbuler Museen," *Belvedere*, IX, 1932, p. 15, fig. 28.

44. I did not have an opportunity to examine the piece. The observation about the knob is based solely on the study of its reproduction and thus needs further verification.

45. E. Kühnel, "Die Metallarbeiten," in Fr. Sarre and F. R. Martin, *Die Ausstellungen von Meisterwerken muhammedanischer Kunst in München*, Munich, 1912, II, pl. 146.

46. *Otchet Imperatorskoĭ arkheologicheskoĭ kommissii za 1898 god*, St. Petersburg, 1901, p. 88, fig. 147, also E. Kühnel, *op. cit.*, pl. 153. The plate has been published recently by A. Yakubovskiĭ, "Kashgarskoye blyudo XII–XIII vv," *Pamyatniki epokhi Rustaveli*, Leningrad, 1938, pp. 209 ff.

47. E. Kühnel, "Zwei Mosulbronzen und ihr Meister," *Jahrbuch der preussischen Kunstsammlungen*, LX, 1939, pl. II.

48. *Op. cit.*, fig. 13.

49. M. Aga-Oglu, "Islamische Metallarbeiten aus Istanbuler Museen," fig. 28.

50. E. Kühnel, "Die Metallarbeiten," pl. 144, no. 3064. The shape was also known to the Syrian metal workers, being undoubtedly introduced from North Mesopotamia. See G. Migeon, *Exposition des arts musulmans au Musée des arts décoratifs*, Paris, 1930, pl. XVIII.

51. E. Herzfeld, *Der Wandschmuck der Bauten von Samarra und seine Ornamentik*, Berlin, 1923, p. 103, figs. 134–136, 153, 154, and pl. LXIII.

52. S. Flury, "Les décor épigraphique des monuments de Ghazna," *Syria*, VI, 1925, pls. X, 2, and XIII, 1.

53. For the reproductions see A. U. Pope, "The Architecture of

year 514 (1120) in Bistam,[54] as well as in modified form on the mihrab of a mausoleum in Arabquh (Province of Yazd).[55] Once more we find it as a lambrequin-like frieze composed of bricks on the Mil-i Radkan near Quchan, constructed in the year 680 (1281).[56] From Ghazna the motif was carried to India, where we encounter it in Delhi, carved in stone, on the tomb which is believed to be that of Iltutmish (died 633/1236).[57] In the regions west of Iran the frieze in identical form occurs in the Ulu Jami' in Wan.[58] In this structure of the Seljuq period it decorates the interior wall in exactly the same manner as in the mosque in Qazwin, and is undoubtedly of direct Iranian inspiration, if not a work of an Iranian artist. The presence of this motif in Iran throughout the twelfth and thirteenth centuries is of importance. While it was very popular in that country, the motif was not used, save for a single exception, in North Mesopotamian, Anatolian, or Syrian architectural decoration. The only known example is the stucco lintel of a door in the Christian-Chaldean church, Mar Shem'un, in Mosul.[59] Stylistically of the thirteenth century, the motif has here been rendered in modified form, interlaced with arabesque palmettes. Thus there can be no doubt that the motif under discussion was introduced into the ornamental repertoire of the Mosul school from Iran, as were many other technical and decorative elements. Its use on the incense burner in the British Museum, as well as on the candlestick and the plate already mentioned, was dictated by the desire to replace the ordinary and commonly used arcades with more decorative niches.

The simple arcade is represented by the lower part of an incense burner formerly in the collection of Friedrich Sarre and now in the Staatliche Museen in Berlin (Fig. 9).[60] As on the Eumorfopoulos canteen now in the Freer Gallery,[61] the Christian personages (saints) are standing under the arches, some holding ecclesiastical objects, the others praying or engaged in conversation. The background of the figures is filled with arabesque scrolls, the lower rim has a simple, plaited double-strand with inserted beads, and the feet are ornamented with scrolling arabesques.

The question of where the inlaid bronzes with Christian subjects were manufactured has been frequently discussed. Some of them were very probably made in North Mesopotamia, and the others in neighboring Syria. The incense burner of the British Museum is undoubtedly such a Syrian work produced under strong North Mesopotamian influences. Its Syrian origin is indicated not only by the type of figural motifs, but also by the arabesques filling the spandrels and the loop-like partitions. These and the undulating scrolls of the lower rim in their sketchy forms are typically Syrian. Moreover, the feet of the incense burner with their angular surfaces seem to have been a peculiarity of some Syrian pieces.[62]

The artists of these metal works, including the two incense burners here described, were Christians, beyond any doubt. But they were thoroughly schooled in the principles of Islamic art; and most likely it was through the intermediary of such Christian artists that the type of incense burners under discussion was first introduced into Islamic decorative arts. That Christian artists continued their crafts throughout the entire Middle Ages, transmitting them from generation to generation, is best illustrated by an account of William, Archbishop of Tyre. Relating the events of the year 1098 A.D., he speaks of an Armenian family of armorers in Antioch with the following observation: "Erant autem ex eis in civitate familiae valde nobiles, antiquam ducentes ex generosis proavis sanguinis dignitatem; inter quas erat tribus una generositate insignis, quae dicebatur Beni Zerra; quod in lingua latina interpretatur, filii loricatoris. Hi enim, sive a primo eorum parente, qui hanc artem exercuit, sive ab eo quod ipsi hanc professionem exercerent, ut loricas intexerent, dicebantur filii loricatoris. Probabilius tamen est et videtur, quod quidam ex eis adhuc eidem arti darent operam; ut, secut nomen habebat hereditarium, ita et per successionem traditam artem non deserent."[63] This was, most certainly, not an isolated case. There were in Damascus, Aleppo, Amid, Mosul, and other

the Islamic Period," *A Survey of Persian Art*, IV, pl. 305; also V, pl. 523.

54. *Op. cit.*, IV, pl. 360 B.

55. A. Godard, "Arabkuh," *Athar-é Iran*, I, 1936, fig. 37.

56. E. Diez, *Churasanische Baudenkmäler*, Berlin, 1918, pl. 7.

57. J. A. Page, *An Historical Memoir on the Qutb: Delhi.* (*Memoirs of the Archaeological Survey of India*, XXII), Calcutta, 1926, pp. 13 f., pl. XI.

58. W. Bachmann, *Kirchen und Moscheen in Armenien und Kurdistan*, Leipzig, 1913, pl. 61.

59. Fr. Sarre and E. Herzfeld, *Archäologische Reise im Euphrat- und Tigris-Gebiet*, Berlin, 1911–20, II, pp. 292 f., fig. 279; also G. L. Bell, *Amurath to Amurath*, London, 1911, p. 259, fig. 172.

60. Fr. Sarre, *Erzeugnisse islamischer Kunst*, p. 14, no. 21.

61. M. S. Dimand, "A Silver Inlaid Bronze Canteen with Christian Subjects in the Eumorfopoulos Collection," *Ars Islamica*, I, 1934, fig. 2.

62. Compare the feet of the piece in The Metropolitan Museum of Art, Fig. 15.

63. *Willermi Tyrensis Archiepiscopi Historia Rerum in Partibus Transmarinis Gestarum*, in *Recueil des historiens des croisades. Historiens occidentaux*, Paris, 1864, V, chap. XI, p. 212. Here is the translation by E. A. Babcock and A. C. Krey, *A History of Deeds Done beyond the Sea*, New York, 1943, I, pp. 241 f.: "There were among the people in the city certain very noble families, inheritors of the ancient dignity of race from distinguished ancestors. Among these was a family notable for its lineage, by name Beni-Zerra, which means, in the Latin tongue, sons of the makers of breastplates. For thus they were called, either from the fact that their original ancestor practiced this art, or because they themselves carried on that trade. It seems quite probable indeed that some of this family still followed that craft and exercised the art, which had been handed down through successive generations and to which they owed their hereditary name."

FIG. 1. Berlin, Staatliche Museen: Incense Burner, Coptic, Early Mediaeval

FIG. 2. Berlin, Staatliche Museen: Incense Burner, Byzantine, Early Mediaeval

FIG. 5. Ownership Unknown: Incense Burner, North Mesopotamian or Syrian, XIIIth Century

FIG. 3. Paris, Louvre: Incense Burner, Iranian, First Half of the XIth Century

FIG. 4. Berlin, Staatliche Museen: Incense Burner, Iranian, First Half of the XIIth Century

FIG. 6. London, British Museum: Incense Burner, North Mesopotamian (Mosul), Dated 641 (1243/44)

FIG. 7. Cairo, R. Harari Collection: Incense Burner, North Mesopotamian, First Half of the XIIIth Century

FIG. 8. London, British Museum: Incense Burner, Syrian, XIIIth Century

FIG. 9. Berlin, Staatliche Museen: Lower Part of an Incense Burner, Syrian, XIIIth Century

FIG. 10. Baltimore, Walters Art Gallery: Incense Burner, Syrian, Second Half of the XIIIth Century (Courtesy of the Walters Art Gallery)

FIG. 11. Prague, Umělecko-Průmyslové Museum: Incense Burner, Syrian, End of the XIIIth Century

FIG. 12. Cairo, R. Harari Collection: Incense Burner, Syrian, End of the XIIIth Century

ancient artistic centers of Syria and North Mesopotamia a great number of craftsmen who remained faithful to their Christian beliefs, and were in many other aspects of material and spiritual life participants alongside their Moslem compatriots in the creation of that which we are accustomed to call the Islamic civilization. This was particularly true in the realm of artistic endeavors. Thus the artist who made the candlestick in the Musée des Arts Décoratifs, Dawud ibn Salama, himself undoubtedly a Christian, was one of the outstanding representatives of the Mosul school. Inlaid metals with Christian subjects were not produced exclusively for Christian institutions or patrons of art, but also for Moslem rulers. According to its inscription, the famous basin in the collection of the Duke of Arenberg in Brussels was made for the Ayyubid sultan, Malik Salih Najm al-Din Ayyub.[64] Its artist remains anonymous, but must have been a Christian who was not only thoroughly familiar with Biblical iconography, but was also one of the great masters of Islamic decorative arts. Another artist, this time a Moslem, 'Ali ibn Hamud, was patronized by a Turkish amir, Atmish al-Sa'di, for whom he made a silver inlaid ewer in the year 673 (1274), and also by a certain Christian, whose name, Haqta(?) ibn Theodora, is inlaid on the vase dated 651 (1259) and ornamented with non-Christian figural motifs.[65] These facts can be easily multiplied and supplemented with examples from other fields, but this would be beyond the limit of the present thesis. I shall return to this highly important subject elsewhere in the future.

We come now to what is artistically one of the most outstanding pieces of the entire group — the brass incense burner in the Walters Art Gallery in Baltimore (Fig. 10). Identical in shape to the foregoing pieces and inlaid with silver only, its lower part is decorated with units of scrolling stems symmetrically composed and coalescing with water fowls (widgeons and swans?) and a pair of animal heads. It is of significance to notice how the tails of some of the birds terminate in volutes. The scrolling units, in their turn, are connected with each other by lion masks. The plumage of the birds and the details of the animal heads are engraved with utmost care and grace. Contrasting with the delicate drawing of the body is the bold, perforated design of the cover, consisting of heavy scrolling stems carrying large arabesque leaves. Although the ornamental motif of the lower part is unique in its compositional treatment, and has no counterpart among known Islamic inlaid metals, nevertheless in its component elements it finds parallels among the metals of the thirteenth century. The varieties of the so-called "grotesque" arabesques employed in Islamic art are well known,[66] but in its present rendering it is quite unusual, in that, instead of heads only, the entire bodies of the birds combine with the scrollwork. In North Mesopotamia, as far as I am aware, the motif finds its only similar, but not identical, parallel in the stucco carvings of Qara Saray near Mosul. Here in a frieze birds of different species are standing with folded wings in confronted position, their tails coalescing with undulating stems.[67]

It should be observed, however, that birds connected with scrollwork also decorate some North Mesopotamian and Syrian inlaid metals. But these are always represented either in pairs fighting each other, or in groups of four, or six or more, in flight. In the former country the motif almost always remained a secondary ornamental element, and thus quite different in its function from that on the incense burner. Here, not only is the motif the principal decoration, but also its substance differs considerably; namely, in that the fowls are depicted as swimming. Hence they are represented with folded wings and "submerged" legs. The subject in itself is therefore unprecedented in the repertoire of inlaid metals. Another important feature of the design is the careful engraving of details. The fine rendition of the plumage, the S-like double lines — the upper curve forming the eye and then extending downward so that the lower curve forms the alula of the bird — are executed with great ingenuity. In this respect the design is linked to the late thirteenth-century Syrian works. The artists of Mosul were interested primarily in the general effect of inlaid decoration, and were less particular about the engraving of details. The inlaid metals of Syria, however, showed a marked tendency and a steadily increasing devotion of the artist to the difficult engraving of de-

64. M. van Berchem, "Arabische Inschriften," in Fr. Sarre and F. R. Martin, *op. cit.*, I, pp. 6 ff.

65. For the works by 'Ali ibn Hamud see G. Wiet, "Un nouvel artiste de Mossoul," *Syria*, XII, 1931, pp. 161 ff., or *L'exposition persane de 1931*, Cairo, 1933, pp. 36 ff.

66. The origin of the motif goes back to the animal style of greater Asia, and thence it was introduced both to Europe and the Near East. The subject deserves a monographic study. In the meantime see the bronzes found in Yenissei and Kotshkar, both reproduced in J. Strzygowski, *Altai-Iran und Völkerwanderung*, Leipzig, 1917, pp. 214, 216, fig. 178, no. 13, and fig. 180. For the European examples see A. Goldschmidt, *Die Elfenbeinskulpturen aus der Zeit der karolingischen und sächsischen Kaiser, VIII–XI Jahrhundert*, Berlin, 1914–26, I, p. 85, no. 180, II, pl. LXXXIII, or M. H. Longhurst, *Catalogue of Carvings in Ivory, Victoria and Albert Museum*, London, 1927, I, p. 66, no. 254, pl. XLI. For an Armenian example, A. Sakisian, "Thèmes et motifs d'enluminur et de décoration arméniennes et musulmanes," *Ars Islamica*, VI 1939, p. 81, fig. 24.

67. Fr. Sarre and E. Herzfeld, *op. cit.*, II, p. 241, and III, pl. XCVII. Birds coalescing with stems also decorate the illuminated chapter-head of an Armenian Bible dated 1295 in the Library in Etchmiadzin, reproduced in Graf A. S. Uvarov, "Echmiyadzinskaya biblioteka," *Trudy arkheologicheskavo s'yezda v Tiflise, 1881*, Moscow, 1887, p. 365, pl. XII, no. 28. For a Syrian parallel see the capitals from Hama, published by R. M. Riefstahl, "Vier syrische Marmorkapitäle mit figuralen Darstellungen in der Moschee zu Boz Üjük," *Der Islam*, XX, 1932, pp. 186 f., fig. 11.

tails, be it the pattern of a gown, the plumage of birds, or the fur of animals. This Syrian stylistic peculiarity reached its highest degree of perfection from approximately the last decades of the thirteenth until about the middle of the following century. The most important Syrian inlaid work displaying the final phase of this technical perfection is the famous basin in the Musée du Louvre known as the "Baptistère de Saint-Louis," which in my opinion is a work of the early fourteenth century.[68] Its artist, the master Muhammad ibn al-Zayn, was probably a native of Damascus where the art of inlaying remained still at its height during the last decade of the same century. Of great interest in this regard is the personal observation of the Italian traveler, Simone Sigoli, who visited Damascus between 1384 and 1385. The passage relating to his description of the metal industry in that city, which until now has remained unnoticed by students writing on the subject, reads as follows: "Ancora vi si fa grande quantità di bacini e mescirobe d'ottone, e propriamente paiono d'oro, e poi ne'detti bacini e mescirobe vi si fanno figure e fogliami e altri lavorii sottili in argento, ch'è una bellissima cosa a vedere. E così di tutti i mestieri vi sono perfettissimi a grandi maestri, e veramente l'ordine ch'eglino hanno tra loro è una bella e nobile cosa, però che se'l padre sarà orafo, i figliuoli non possono giammai fare altro mestiere che questo, e così vanno di discendente in discendente, sicchè per forza conviene che sieno perfetti maestri d'eloro mestieri."[69]

A further suggestion for the Syrian origin of the incense burner of the Walters Art Gallery is found in the decoration of a silver inlaid cylindrical inkstand in the Schloss Museum in Berlin.[70] Unmistakably a Syrian work, it is decorated, in addition to round medallions containing mounted hunters, with scrolling stems carrying the foreparts of animal bodies and flying birds, among these being two ducks with folded wings, the tails of which end in volutes in exactly the same manner as the tails of the birds on the incense burner. Moreover, the lion masks holding the stems together occur on both pieces. But for our comparative observation, the most suggestive motif on the inkstand consists of the bands of the uninterrupted scrolls carrying waterfowls with folded wings and "submerged" legs.

A few words should be said about the decoration of the cover of the incense burner in the Walters Art Gallery. It is not without importance to observe that stylistically related and symmetrically composed heavy scrolling stems carrying arabesque leaves find their parallel on the famous vase of the so-called "Collection Barberini."[71] This vase, made for the Ayyubid ruler of Aleppo and Damascus, al-Nasr Salah al-Din Yusuf (634/1236–658/1260), is most certainly a work from a Syrian atelier.[72] Thus this incense burner is neither Iranian, as classified in recent publications,[73] nor a work of North Mesopotamia, but a product of Syria during the second half of the thirteenth century.

To the end of the same century also belongs the silver- and gold-inlaid incense burner in the Uměleckо-Průmyslové Museum in Prague (Fig. 11).[74] The lower part of the piece is bordered by gold meander bands which at certain intervals interlace to form round medallions. These enclose seated musicians playing the flute and tambourine. The spaces between the medallions, on a background of leafy scrolls, are occupied by standing figures. The same design is repeated on the cover with additional bands of benedictory inscription interrupted by wheel rosettes. The decoration of the joining rims consists of oblique lancets. That of the lower rim consists of flying waterfowls, while the feet have double-headed eagles. The background of the figures in the medallions on the cover has been entirely cut out, as in the incense burner with Christian subjects in the British Museum.

The type of figures,[75] the frieze of flying waterfowls, and the use of gold in the inlay are very characteristic of

68. The present writer was the first to recognize in this basin a work of Syrian origin. See my "Ein Prachtspiegel im Topkapu Sarayi Museum," *Pantheon*, II, 1930, p. 457. The same opinion has been expressed recently by M. S. Dimand in *Ars Islamica*, VIII, 1941, p. 210.

69. *Viaggio al Monte Sinai*, Parma, 1843, pp. 61 f. Freely translated, the passage means: "There are still made great quantities of brass basins and ewers, almost gold-like in appearance, and these basins and ewers are inlaid with figures, foliage, and other delicate designs in silver, which are most beautiful to see. There are perfect great masters of all crafts and truly the organization which they have established among themselves is a beautiful and noble thing, wherefore if the father should be a goldsmith, the sons can never thereafter be engaged in any other craft than this, and so it goes from generation to generation so that by force of circumstances they are obliged to be perfect masters of their craft."

More than three centuries earlier the vessels of "gold-like" Damascus brass attracted the attention of the Iranian traveler, Nasir-i Khusraw, who saw them in Cairo. See *Sefer-Nameh*, ed. Ch. Schefer, Paris, 1881, p. 52,13. Cf. also my "A Brief Note on Islamic Terminology for Bronze and Brass," *Journal of the American Oriental Society*, LXV, 1945, p. 223. Other historical accounts of the metalwork in Syria will be presented in the first volume of my *Corpus*.

70. Reproduced in E. Kühnel, *Islamische Kleinkunst*, Berlin, 1925, fig. 115.

71. G. Migeon, *L'Orient musulman*, pl. 30.

72. The best testimony for its Syrian origin is the shape of the vase. Cf. the famous sixth-century silver vase found in Hims, Ch. Diehl, "L'École artistique d'Antioche et les trésors d'argenterie syrienne," *Syria*, II, 1921, pl. XII.

73. R. Harari, *op. cit.*; not mentioned in the text but reproduced in pl. 1338B; also Ph. Ackerman, *Guide to the Exhibition of Persian Art*, New York, 1940, p. 289.

74. E. Kühnel, "Die Metallarbeiten," pl. 151, no. 3067, published as "Mesopotamian XIII century"; in *Ausstellung München 1910. Amtlicher Katalog*, Munich, 1910, p. 229, with the same attribution but with a question mark.

75. Unfortunately the silver inlays of the figures have fallen out. There can be no doubt that these were minutely engraved in accordance with the prevailing style.

the metal works produced in the Syrian ateliers. It should be stressed that the occurrence of the double-headed eagle on the incense burner does not conflict with its origin, since this heraldic motif, as has already been pointed out, was known and frequently employed in the decorative arts of Syria.

It is without any justification that one of the most typically Syrian incense burners (Fig. 12) has been published by its eminent owner, R. Harari, as an Iranian work.[76] There is not a single ornamental motif in the piece which can be attributed to Iran. The broken T-fret, the interlaced eight-foiled medallions filled with a flock of flying waterfowls around a central whorling rosette are elements which occur again and again on Syrian inlaid metals. Moreover, the arrangement of the inlaid design on the feet is direct testimony to its origin. Here a whorling rosette occupies the upper part and the remaining surface is covered by leafy arabesque scrolls. Exactly the same composition of design can be seen on the feet of the incense burner bearing the name of the Mamluk Sultan of Egypt, Malik Nasir Muhammad ibn Qalawun (Fig. 14). This stylistic connection, be it remembered, shows the influences exercised by the Syrian metal industry upon the inlaid works of Mamluk Egypt. The R. Harari incense burner differs from all known pieces of the type because of the shape of its knob.[77]

As previously stated, only two pieces of all preserved incense burners of the type have their handles intact. One of these is in The Metropolitan Museum of Art (Fig. 13).[78] It is inlaid with silver and gold, and on a background of T-fret pattern displays round medallions, each enclosing an enthroned personage flanked by a flagon and beaker. Between the medallions are elongated shields containing simulated *kufi* inscriptions inlaid in gold, and additional hexagonal wheel rosettes. The band of benedictory inscription at the base of the knob — interrupted by round rosettes — oblique lancets, and plaited strands on the rims, complete the decoration of the body and the cover. The tube-like, tapering handle is inlaid with a loosely twisted double-strand with inserted beads, simulated *kufi* inscription, and undulating stems of leafy arabesques. The first and the last of these motifs, in addition to lancets and arabesque devices, adorn the somewhat angularly surfaced feet. The incense burner is a Syrian work of the early fourteenth century and represents stylistic features which can be observed on a large number of inlaid metals, as, for example, the cylindrical box at one time in the possession of Demotte.[79]

Incense burners of this type were evidently still produced in Syria during the second half of the fourteenth century. G. Wiet describes a dome-shaped cover in a private collection in Cairo. The silver inscription names a certain functionary of Saif al-Din Mankali-Bugha, the Governor-General of the province of Damascus, whose administration terminated in the year 768 (1367).[80]

From Syria this type was introduced into Egypt during the Mamluk period. Although the shape remained the same, the decoration underwent stylistic changes. Figural design was generally avoided and inscription, frequently of historical content, became the dominant ornamental element. Arabesque scrolls and various palmette devices also gave place to more or less stylized floral design. Two important incense burners representing the Egyptian group have been preserved, and both were made for the Mamluk Sultan, Malik Nasir Muhammad ibn Qalawun, who ruled, with interruptions, from 693 (1293) to 741 (1341). One of these is in the Victoria and Albert Museum (Fig. 14) and the other in the collection of the late Baron Edmond de Rothschild. Richly inlaid with silver and gold, its decoration consists of inscription bands interrupted by multifoiled medallions containing more inscriptions composed in a circle around heraldic inscribed rosettes.[81] The background of the inscriptions, as well as the spaces above and below the bands between the additional heraldic rosettes, are thickly filled with stylized blossoms and leaves. The rims are occupied by a simple zig-zag pattern, and the feet display floral design, in addition to an inscribed shield. Attention should be directed to the form of the knob which differs considerably from those of Syrian and North Mesopotamian pieces. Its convex-fluted surface and somewhat simplified profile seem to be Egyptian peculiarities. An identical knob also surmounts an unpublished Mamluk mosque suspension in the shape of a chalice with conical cover in the Türk ve Islâm Âsari Müzesi in Istanbul.

The incense burner of the Victoria and Albert Museum is one of twenty-eight known metal objects inscribed with the name of Sultan Malik Nasir Muhammad ibn Qalawun.[82] Among these, the most important is the famous *kursi* dated 728 (1328) and signed by Muhammad ibn Sunqur Baghdadi, Sinayi.[83] Although the artist was not a

76. R. Harari, *op. cit.*, VI, pl. 1338A. This incense burner, or its counterpart, has been reproduced in J. W. Mollett, *An Illustrated Dictionary of Words Used in Art and Archaeology*, London, 1883, p. 319, fig. 652.

77. Is this a late addition?

78. The piece was published by E. Kühnel, "Islamischer Rauchergerät," col. 243, fig. 91, long before it was presented to the Museum by the late J. P. Morgan.

79. This box has been reproduced by R. Harari, *op. cit.*, pl. 1335, as an Iranian work, without explanation; it is of typical Syrian manufacture, as is pertinently observed by M. S. Dimand, *op. cit.*, p. 212.

80. *Objets en cuivre*, p. 219, no. 272.

81. On this and similar blazons consult L. A. Mayer, *op. cit.*, pp. 34 f.

82. See the list in G. Wiet, *op. cit.*, pp. 27 and 200 ff.

83. *Op. cit.*, pp. 14 ff., pls. 1 f. A hypothetical question might be asked: was the artist of the pen box of the year 680 (1281)

native of Cairo, his style, nevertheless, is typically Egyptian, and there is not a single ornamental motif decorating his work which can be considered as having been introduced from distant Baghdad. On the contrary, we find many parallels among the decorations of inlaid metals of Syro-Egyptian workmanship. The heraldic inscribed rosettes, the inscriptions in Mamluk *naski* in circular composition, and the multifoiled medallions, occur both on the *kursi* and the incense burner. Stylistically related also are the floral designs of both pieces, although they are more luxuriantly executed on the incense burner. Thus, there can be no doubt that the piece under consideration was produced sometime between 1328 and 1341.[84]

We now come to the consideration of the Iranian examples of the group. It has already been pointed out that this particular type of incense burner was carried from North Mesopotamia to Iran. This introduction took place, certainly, before the Mongol invasion, when the artistic relations between Iran and the countries lying to the west still followed their normal course.

Foremost place among the Iranian incense burners of the type should be given to a recently rediscovered piece. Hidden for many decades among the art treasures of the late J. P. Morgan,[85] this incense burner (Fig. 15) is a welcome addition to the repertoire of Islamic metal works of noted historical significance. Cast of bronze and richly ornamented with silver inlay, it is 20.5 cm. high and has a cylindrical, slightly tapering body resting on three heavy feet. Its cover is dome-shaped and surmounted by a strongly profiled knob. Except for slight damage on one side of the lower part, at present patched by a square sheet of metal, and some silver pieces which have fallen out of the inlaid decoration, the incense burner is in a fairly good state of preservation. Its straight, projecting handle is also missing, but such is the case with all known incense burners of this type, save the two pieces already mentioned. The cover was originally attached to the lower part by a hinge and an additional chain, both of which have been broken, with only small parts still remaining.

The inlaid decoration is arranged in registers and covers the entire surface of the body and lid. This decoration, bordered on the body by meander strips, consists of four arabesque units, alternating with four lozenge-shaped, foiled medallions. The arabesque units are composed of symmetrically scrolling and intersecting stems carrying full and half-palmettes. Three of the medallions, against an arabesque background, contain a representation of the moon, depicted as a youthful, seated figure in frontal view with crossed legs and lifted arms holding a crescent around its head. The fourth medallion has been left plain and was originally covered by the joining end of the handle. The same ornamental motifs also occur in the principal register of the cover, the only variation being that the arabesque units are differently composed. Also, the ground here is pierced by small, round holes to permit the escape of aromatic fumes. Around the base of the knob, within a straight line, is an additional band containing an inscription. The knob itself has interlaced, semicircular lines crowned with palmettes on its curved section. The upper set-off rim of the body and also that of the cover are inlaid with oblique lancets in such manner that together they form a chevron. Finally, the lower rim has a loosely twisted double-strand with inserted beads, and the frontal surfaces of the feet are decorated with arabesque scrolls. The bottom of the body is left open, and inside its upper part is a shallow receptacle surrounded by an undulating stem with attached half-palmettes, likewise inlaid with silver.

The inscription (Fig. 16), inlaid upon a background of raised, dented scrolls, is without diacritical points. It consists of two distinct parts, both in textual content as well as in the style of script. The first part is a short, common eulogy, written in formal *naski* character, and reads:

العز والبقاء والمدلحه [*sic*] والثناء

"The glory, the longevity, [. . .] and the praise." The

Mahmud ibn Sunqur, a senior brother of Muhammad ibn Sunqur? There is a space of 47 years between the dates of their respective works, which differ from each other also in style. But it is not impossible that they might have been half-brothers and were born some twenty or twenty-five years apart — a circumstance especially common in a society with the institution of polygamy. The difference in their styles is easier to explain. They were the offspring of two fundamentally different schools. Mahmud was probably active in Iran, while Muhammad was schooled in Cairo. Both artists were sons of a Turkish father — a fact which is implied by their parental name: Sunqur.

84. Present conditions prevent the publication of the counterpart of this incense burner in the collection of the late Baron Edmond de Rothschild. In *Katalog mezhdunardnoĭ vystavki pamyatnikov iranskavo iskusstva i arkheologii. Gosudarstvennyĭ Ermitazh*, Leningrad, 1935, p. 475, no. 18, an incense burner is listed without any indication of its shape, as being of bronze on three feet and made for an Egyptian amir of the fourteenth century.

G. Wiet, *op. cit.*, p. 82, no. 3335, pl. XXVII, published a small basin (h. 4 cm., diam. 12 cm.; in the Arab Art Museum), the inscription of which, curiously enough, calls it a *mabkhara*, "incense burner," made for Sultan al-Malik al-Zahir Muhammad. The owner, otherwise known by the name of Malik Zahir Saif al-Din Jaqmaq, ruled from 842 (1437) to 857 (1453). Thus the basin was made sometime between these two dates. G. Wiet has already observed that "on n'aurait jamais pensé qu'il ait pu servir à cet usage." But he did not venture to conjecture the implication of this singular epigraphic statement. Was the small basin an accompanying piece for a real incense burner and used to hold incense for replenishment or receive the ashes? If so, why does the inscription call it an "incense burner"? Possibly the text was composed to be inlaid on the vessel used for thurification, and, without change, was also inlaid on this basin, supposedly belonging to the set. If this hypothesis does not correspond to actual fact, was the production of incense burners of the familiar shape abandoned during the fifteenth century in Cairo?

85. The piece was kept in Mr. Morgan's Long Island home. For this information I am indebted to Miss Belle da Costa Greene, director of the Pierpont Morgan Library in New York.

third word is, in all probability, المدحة, "the praise," but has been inlaid erroneously with a *lam* between *dal* and *ha*. Such mistakes are not unusual in the epigraphic texts, but this particular benedictory word does not occur, so far as I am aware, in the eulogistic protocols of this class. It will be further noticed that the last word الثناء has between *lam* and *alif* three dents instead of two.

The second part of the inscription, written in a light, individualized, cursive script, is the signature of the artist. It reads: عمل حسين بن ابو بكر [*sic*] سنّى رازى "Work of Husayn, son of Abu Bakr [*sic*] Sinni-i Razi."

Before attempting to determine the origin and the period of the artist, a few remarks should be made about the signatory inscription itself. First of all, the artist's paternal name should be in the genitive, and thus spelled أبى بكر Abi Bakr. But again, this obvious grammatical error is not the only exception to be found in the recorded epigraphic texts, and seems to have been a mistake frequently made in the non-Arab countries, Iran[86] and Anatolia.[87] Moreover, the double *nisba* of the artist has been written without the articles *al*. This, as G. Wiet has already pointed out,[88] is characteristic of some signatory inscriptions on objects by Iranian craftsmen.

Grammatically the inscription is far from satisfactory. But it should be kept in mind that most of the craftsmen of the Middle Ages, and especially those of non-Arab origin, were not grammarians. The benedictory or historical inscriptions of the objects made to order were usually composed by secretaries or learned persons, and given to the artist to be engraved or inlaid. Thus, these objects are mostly free from grammatical mistakes. Even so, in some cases they are replete with errors, such as, for example, the inscriptions on the silver vessels of Amir Abu'l-'Abbas Walkin ibn Harun.[89] However, when the objects were not made on specific order, it is more likely that the artists themselves composed the texts of the inscriptions. Such would seem to have been the case with our incense burner.

The artist, as his *nisba* indicates, was a native of al-Sinn of al-Rayy. We would be at a loss to identify this particular locality if al-Istakhri, the famous geographer of the early tenth century, did not inform us about it. In his description of the province al-Jibal, our authority states that among the famed districts belonging to the territory of al-Rayy were "the Inner and Outer Qasrans, Bihzan, al-Sinn, Bashawiya, and Dunba."[90] Unfortunately, however, neither al-Istakhri himself nor the reviser of his work, Ibn Hawqal,[91] offers any additional details concerning the exact location of the district. About two and a quarter centuries later, al-Sam'ani (died 562/1166) in his *Kitab al-Ansab* mentions al-Sinn, not as the name of a district, but as a village belonging to the territory of al-Rayy.[92] His information, however, is based on the authorities of an earlier period. The same is also the case in the accounts of Yaqut al-Hamawi. First, in his description of al-Rayy, which he visited shortly before the occupation of the city by the Mongols in the year 617 (1220), the author quotes,[93] word for word, the passage of al-Istakhri. Later he returns to the subject, and this time expressly relates his information to the well-known theologian, al-Hazimi, who was a native of Hamadan, but lived and died in Baghdad in the year 584 (1188).[94] Al-Sinn, this time, is mentioned in connection with certain learned men simply as "a place in the district of al-Rayy."[95]

This is all we know about al-Sinn of al-Rayy. Zakariya al-Qazwini and al-Dimashqi are silent, and even such an authoritative writer on Iran as Hamd Allah Mustawfi, who discourses at length about the administrative districts of al-Rayy and mentions many towns and villages within the territory, does not record it at all.[96] Thus we may infer with reasonable certainty that the district and its homonymous village were no longer known under the name of al-Sinn during the lifetimes of these authors, i.e., during the Mongol period. Was the name of the district changed some time during the Seljuq administration? Whatever the case may have been, it remains certain that the village al-

86. See M. Kanykoff, "Sur quelques inscriptions musulmanes du Caucase," in *Mélanges asiatiques tirés du Bulletin historico-philologique de l'Académie impériale des sciences de St.-Pétersbourg*, 1849–52, I, p. 248; also *Répertoire chronologique d'épigraphie arabe*, ed. E. Combe, J. Sauvaget and G. Wiet, Cairo, IX, 1937, p. 31, no. 3247.

87. M. van Berchem and Halil Edhem, *Asie Mineur. Corpus Inscriptionum Arabicarum*, III, Cairo, 1910, pp. 10, note 1, and 36, no. 23; Mübarek Galib, *Ankara. Anatolu Türk Asar ve Mahkukati Tetebuatina Esas*, Istanbul, 1922, I, pp. 47, 48, and 53, II, pp. 4, 9, and 25; Rizvan Nafiz ve Ismail Hakki, *Sivas sehri*, Istanbul, 1928, p. 153; see also L. A. Mayer, *op. cit.*, p. 118.

88. *L'exposition persane de 1931*, p. 47, no. 51.

89. G. Wiet, *op. cit.*, pp. 18 ff.

90. *Masalik al-Mamalik*, ed. J. de Goeje, Leyden, 1870, p. 209,6. ومن رساتيقها المشهورة قصران الداخل والخارج وبهزان والسنّ وبشاويه ودنبا

91. *Al-Masalik wa'l-Mamalik*, ed. J. de Goeje, Leyden, 1873, p. 270,16, repeats word for word the passage of al-Istakhri. In the Topkapi Sarayi codex edited by J. H. Kramer, *Opus geographicum auctore Ibn Haukal*, Leyden, 1938, p. 379,12, the passage has been distorted and instead of السنّ stands الشبر.

92. Ed. D. S. Margoliouth, Leyden, 1912, fol. 315b,22 f.: السنّ قرية من قرى بالرى. See also the synopsis of al-Sam'ani's book by Ibn al-Athir, *Al-Lubab*, Cairo, 1938, I, p. 573,6.

93. *Mu'jam al-Buldan*, II, p. 894,22.

94. C. Brockelmann, *Geschichte der arabischen Literatur*, Weimar, 1897–1902, I, pp. 356 and 366.

95. *Op. cit.*, III, p. 196,9: السنّ في موضع من اعمال الرى. See also his *Mushtarik*, ed. F. Wüstenfeld, Göttingen, 1846, pp. 251 f., and al-Dhahabi, *Kitab al-Mushtabih fi Asma al-Rijal*, ed. P. de Jong, Leyden, 1881, p. 279,7.

96. *Nuzhat al-Qulub*, ed. G. Le Strange, Leyden, 1915, pp. 52,11 ff. His contemporary, Abu'l-Fida, *Taqwin al-Buldan*, ed. J. T. Reinaud and MacGuckin de Slane, Paris, 1840, pp. 288 f., quotes the passage of Yaqut's *Mushtarik*.

Sinn continued to exist until the Mongol invasion, a fact which is confirmed by the *nisba* of our artist, Husayn ibn Abi Bakr, whose incense burner unmistakably belongs, as we shall see later, to the second quarter of the thirteenth century.

There remains still the question: why did the artist, instead of calling himself merely al-Sinni, employ a double *nisba*? The reason for this is readily explained. First of all, the case is not an isolated one. Al-Sam'ani,[97] Yaqut,[98] and a number of other mediaeval writers mention several persons who were likewise known by the same *nisba* of al-Sinni al-Razi. Apparently there was a necessity for these men, as well as for our artist, to indicate explicitly that they were natives of al-Sinn, situated in the territory of al-Rayy, because there existed in 'Iraq during the Middle Ages several homonymous localities. One of these was a village near Baghdad;[99] the other, a castle near Sumaisat in al-Jazira (upper Mesopotamia),[100] and the third, a well-known town lying on the eastern bank of Dijlah (Tigris) between Mosul and Takrit which was also frequently called al-Sinn al-Barimma.[101]

Evidently there was another compelling reason for the adoption of this double *nisba* by Husayn ibn Abi Bakr. He lived during one of the most turbulent periods of Iranian history. His native territory, al-Rayy, was overrun by the Mongol invaders in the year 617 (1220). The massacres and destruction wrought by the conquering armies were disastrous for the intellectual and economic life of Iran. Many prominent men of religion, letters, sciences, and the arts were forced during the first decades of Mongol rule to seek material and spiritual safety in 'Iraq, Syria, and Anatolia, where the arts were in full bloom under the patronage of the Seljuq, Zengid, and Ayyubid rulers. The contributions of the Iranian immigrants during this period to the art and architecture of these countries are well known, and there is no need to enumerate them here.[102] Thus, in my opinion, Husayn ibn Abi Bakr was one such immigrant who came to North Mesopotamia, possibly to what was then the center of metal work, Mosul, and being not far from al-Sinn on the Tigris, he purposely adopted the double *nisba* so as to distinguish himself from the natives of the neighboring town.[103] A comparative study of his work will show that Husayn ibn Abi Bakr was an offspring of Iranian artistic culture, but active in the sphere of the Mosul school. The shape of the incense burner as a whole and in each component part is identical with pieces of North Mesopotamian manufacture. But more indicative are some of the motifs of its inlaid decoration. In the first place, the meander strip bordering the body and the cover is one of the ornaments most characteristic of North Mesopotamian and Syrian metals. Examples are numerous: it decorates the ewer by 'Ali ibn Hamud of Mosul, another ewer dated 644 (1246) in the Walters Art Gallery, the bowl in Museo Nazionale in Florence, and others.[104] No explanation is needed for the popularity of this particular ornamental motif in the regions of the former Hellenistic East. It was a foreign element for Iranian decorative arts, and if it does occur on some metals of the late thirteenth and fourteenth centuries, it should be attributed to influences emanating from outside. On the other hand, in North Mesopotamia and the regions lying to the west and north, the meander had been known since ancient times, and was frequently employed during Islamic centuries, not only in industrial arts, but also in architectural decoration.[105]

Another minor, but nevertheless typical, motif of our incense burner is the decoration of the lower rim of the body. This consists of an engraved, loosely twisted double-strand with inserted, inlaid beads. In this particular form the motif seems to have been a favored ornament of the North Mesopotamian group of inlaid metals, and it decorates almost all attested pieces of the Mosul school, of which references to only a few will suffice. These are the vase by 'Ali ibn Hamud, the ewer dated 623 (1226) in The Metropolitan Museum of Art,[106] the famous ewer made in Mosul by Shuja' ibn Mana,[107] and another ewer from the

97. *Loc. cit.*

98. *Loc. cit.*

99. Al-Sam'ani, *loc. cit.*

100. Yaqut, *op. cit.*, III, p. 169,18.

101. Ibn Khurdadhbih, *Kitab al-Masalik wa'l-Mamalik*, ed. J. de Goeje, Leyden, 1889, p. 94,5; al-Tabari, *op. cit.*, ser. 2, VI, p. 1945,11. See also G. Le Strange, *The Land of Eastern Caliphate*, Cambridge, 1930, p. 91. There were, moreover, two mountains, one called Sinn al-Sumayra, situated at a distance of five *farsakh* from Dinawar on the great route to Khurasan (Ibn Khurdadhbih, *op. cit.*, p. 119,8), and the other, known as Sinn al-Darb, in Syria (al-Dimashqi, *Nukhbat al-Dahr fi 'Aja'ib al-Barr wa'l-Bahr*, ed. A. F. Mehren, St. Petersburg, 1866, p. 114,6).

102. Consult M. van Berchem and Halil Edhem, *op. cit.*, pp. 9, no. 4, and 8, no. 49; A. Gabriel, *Monuments turcs d'Anatolie*, Paris, 1934, II, p. 127; Fr. Sarre, *Denkmäler persischer Baukunst*, Berlin, 1910, p. 127, and G. Wiet, "L'exposition d'art persan à Londres," *Syria*, XIII, 1932, p. 87. See also A. Abel, *Gaibi et les grands faïenciers égyptiens d'époque mamlouke*, Cairo, 1930, pp. 17 f.

103. R. Harari, "Metalwork of Later Islamic Periods," *A Survey of Persian Art*, III, 1938, p. 2496, was the first to expound the theory of emigration of Iranian artists to Mosul.

104. *Walters Art Gallery. Handbook of the Collections*, Baltimore, 1936, figure on p. 49. The meander band is on the handle. For a better reproduction, see M. Aga-Oglu, "6000 Years of Persian Art. The Iranian Institute's Exhibition in New York," *The Art News*, XXXVIII, April, 1940, figure on p. 10. For the bowl in Museo Nazionale see E. Kühnel, *Islamische Kleinkunst*, Berlin, 1925, fig. 114.

105. It decorates, for example, the capitals of the Jami al-Kabir in Mosul and the mihrab of a mausoleum in Sinjar. See Fr. Sarre and E. Herzfeld, *op. cit.*, II, p. 218, fig. 232; III, pls. IV and CVI.

106. M. S. Dimand, "Dated Specimens of Mohammedan Art in The Metropolitan Museum of Art," *Metropolitan Museum Studies*, I, 1929, fig. 7.

107. G. Migeon, *Les arts musulmans*, Paris, 1926, pl. XLVIII.

year 657 (1259) in the Musée du Louvre.[108] Like the meander, this particular motif was used also in architectural decoration, as, for example, on the minaret of Jami' al-Kabir in Mosul.[109] The motif was, however, not unknown to the Iranian metal workers. Its presence in an earlier period than those of the North Mesopotamian examples is attested by such a piece as the splendid incense burner in the shape of a panther(?) made by 'Ali ibn Muhammad, whose *nisba* still remains to be deciphered. A work of the twelfth century, the piece has around its neck the same twisted strands with inserted copper inlaid beads.[110]

The chevron motif of the joining rims of the body and the cover has a prehistoric antiquity.[111] It was employed as a decoration of moldings, rims, and similar parts of metal objects everywhere, both in the West and in the East. But it can readily be observed that the chevron on our incense burner is formed, not of repeated simple V-shaped pattern, but of oblique lancets. In this particular variation it seems to be another characteristic ornamental motif of North Mesopotamian and Syrian metals, although it occurs in isolated cases on a few Iranian works.

While the shape of the incense burners, the meander design, and even the loosely twisted double-strand with inserted beads, as well as the chevron of oblique lancets, can be recognized as typical North Mesopotamian features, the units of arabesque scrolls decorating the body and cover, and the personification of the moon in the medallions are, in their compositional form and iconographic details, the elements which differ considerably from the North Mesopotamian examples, but find their closest parallels in Iran. An attentive analysis of the arabesque scrolls will confirm their stylistic origin. Those commonly used on the North Mesopotamian bronzes have, primarily, the function of an all-over pattern and thus being a subordinated element, are of secondary value. On the incense burner of Husayn ibn Abi Bakr, however, the arabesque compositions are independent units, and their relation to the medallions is not that of subordination, but of coördination — an indication that the artist must have been schooled in some place where this artistic principle was prevalent. And this place was his native country, Iran, particularly the artistic circle of the Seljuq metropolis, al-Rayy. Unfortunately, no inlaid metals from this artistic center are preserved, but the polychrome painted pottery produced here during the twelfth and early thirteenth centuries presents adequate comparative material. As a parallel, we may invite attention to the magnificent bowl in the Musée du Louvre.[112] The same coördination of ornamental motifs can be observed on the outside of this bowl where the alternating figures and arabesque devices are complementary and not dominating each other. Similarly, the inside of another bowl, at one time in a private collection shows a register divided by elaborate arabesques into compartments, each containing a horseman. The entire design is treated in such a manner that it is impossible to distinguish which is the principal motif, the horseman or the arabesque.[113]

Another general, but by no means unimportant, stylistic feature is the marked difference between the disposition of the inlaid ornaments of North Mesopotamian bronzes and those of our incense burner. As a rule, the ornaments of North Mesopotamian metals, and particularly of the Mosul school, cover every available surface of the object with utmost density, thus leaving very little undecorated background. On the contrary, the ornamentation of our piece is sparsely inlaid against ample background. This, again, is one of the characteristics of the painted decoration of al-Rayy potteries. The same can also be observed on some thirteenth-century engraved and inlaid bronzes of Iran, as, for example, on the candlestick which is said to have been found in Hamadan and is now in the Gulistan Museum in Teheran.[114]

Moreover, the arabesque devices decorating the incense burner are of definite Iranian type and show close stylistic affinities to similar arabesque decoration of the contemporary painted potteries. Each of the identically composed arabesques of the lower part consists of an S-shaped stem repeated in complementary position and carrying both full and half-palmettes with long, hair-like tips. At the joining points, the scrolling stems are held together by small, round beads. Similar beads, or rather, buds, are also attached to various parts of the stems. Noteworthy, too, is the manner in which the half-palmettes meet each other with their tips at the joining section of the stems. Such S-shaped stems, in complementary composition and carrying palmettes, can be seen on the inlaid cylindrical box of East Iranian origin, belonging to the second half of the twelfth century, in the collection of A. Peytel in Paris,[115] or, in more elaborate form, in the thirteenth-century pottery bottle with relief decoration formerly in a private collection.[116] Round beads holding together the scrolling stems, and two half-palmettes meeting each other with their tips so as to form a

108. G. Migeon, *L'orient musulman*, pl. 31, no. 39.

109. Fr. Sarre and E. Herzfeld, *op. cit.*, II, fig. 238.

110. I. A. Orbeli, "Bronzovaya kuril'nitza XIIv. v vide barsa," *Pamyatniki epokhi Rustaveli*, p. 298, pl. 54. For a better reproduction see R. Harari, *op. cit.*, VI, pl. 1304.

111. The motif occurs as the molding decoration on the famous silver vase from Maikop, third millennium B.C. See M. Rostovtzeff, *Iranians and Greeks in South Russia*, Oxford, 1922, pl. II, 4.

112. G. Migeon, *op. cit.*, pl. 28, no. 119.

113. M. Aga-Oglu, *Exhibition of Islamic Art, M. H. De Young Memorial Museum*, San Francisco, 1937, fig. 125; cf. also fig. 145.

114. R. Harari, *op. cit.*, VI, pl. 1316.

115. R. Harari, *op. cit.*, pl. 1311A.

116. R. M. Riefstahl, *The Parish-Watson Collection of Mohammadan Potteries*, New York, 1922, figs. on p. 199.

symmetrical pattern, find, again, their exact parallels in the painted arabesques of al-Rayy potteries.

Besides the ornamentation of the aforementioned bowl in the Musée du Louvre, attention can be called to the principal arabesque decoration of the bowl in the collection of C. L. David.[117] Instead of round beads, the differently shaped scrolling stems of the arabesque devices on the cover of the incense burner are held together by small, rectangular shields and interlaced crescent-like motifs surmounted by palmettes. Both of these details were known in Iran. The former occurs with the same function, for example, on the concave section of the neck of the candlestick already referred to in the Gulistan Museum, and on the pottery plate in the Charles B. Hoyt collection, attributed to Kashan,[118] but, in its arabesque decoration closely related to al-Rayy ware. The crescent-like motif interlaced with scrolls can be seen on the upper part of the body of the Herat ewer dated 577 (1182),[119] in the interior of another thirteenth-century bowl in the Musée du Louvre,[120] or on the lower part of the body of a bottle, where it occurs on the intersecting points of the stems, forming a double ogival lattice design.[121] It is evident even from these brief comparisons that the arabesque decorations of our incense burner are Iranian, both in general stylistic aspects and in the individual elements of which they are composed. These, and other Iranian ornamental elements, can be recognized in a great many inlaid bronzes of North Mesopotamia. But this is a subject which deserves a special treatise, and cannot be adequately dealt with here.

There remain the stylistic and iconographic features of the figural motif in the medallions to be considered, but first, a few words about the motif itself. The generally accepted view that the representation of the moon was "the badge" of Badr al-Din Lu'lu', the Atabek of Mosul,[122] because it happens to appear on his coins and on the Sinjar Gate of his capital city, is based on a hypothetical suggestion made for the first time by M. van Berchem.[123] But it was the same savant who later, in a discussion of archaeological evidence, reached the convincing conclusion that it is impossible to recognize in this planetary sign either a distinctive emblem of a ruling prince or of a dynasty.[124] This final opinion remained, unfortunately, unnoticed by the majority of writers on the subject. It is furthermore believed that the title of this ruler, Badr al-Din, which means "full moon of religion," has a symbolic relation to the representation of the moon. But this again does not correspond to actual fact, since the figure on Atabek Lu'lu''s coins is holding, not a full moon, but a crescent. Moreover, the sign appears on coins minted long before Badr al-Din Lu'lu''s time, in the year 585 (1189), by the Zengid prince of Mosul, 'Izz al-Din Mas'ud I,[125] whose title means "glory of religion," and has nothing to do with the moon whatsoever. Neither can it be the emblem of the city of Mosul, as E. Kühnel is inclined to believe,[126] for the simple reason that the cities of Islamic countries did not have emblems, and Mosul was no exception.[127] Without pressing the argument too far, and reserving further discussion for the future, we should emphasize that the planetary sign under consideration was depicted both on the coins as well as over the Sinjar Gate solely for its magical properties. Examples of such planetary or zodiacal representations on coins, architectural monuments, and objects of decorative art are numerous, and attention will presently be called to a single, but pointed, instance, namely, the centaurus on the coins of the Urtuqid prince of Mardin, Nasr al-Din Urtuq Arslan, dated 599 (1202).[128]

There is no need here to go into an explanation of the astrological views of the Islamic peoples and the magical significance they attached to celestial bodies. A characteristic document, and one pertinent to our subject, is the bronze mirror in the R. Harari Collection. Dated 548 (1154) and of Mesopotamian origin, it is ornamented in relief with representations of seven planets. The astrological purport of the mirror is evident, not only from its decoration, but also from its inscription.[129] The figures on this mirror are, as far as I am aware, the oldest dated examples of Islamic planetary signs, and therefore deserve to be placed at the beginning of our discussion. In spite of the sketchy nature of the cast relief, the iconographic form of

117. A. U. Pope, "The Ceramic Art. A History," *A Survey of Persian Art*, V, pl. 658.

118. R. Ettinghausen, "Evidences for the Identification of Kashan Pottery," *Ars Islamica*, III, 1936, fig. 24.

119. Gräfin P. S. Uwarow, *Die Sammlungen des kaukasischen Museums*, Tiflis, 1902, V, pl. XV.

120. G. Migeon, *op. cit.*, fig. 59. In this connection it is interesting to note that identical ogival lattice design with crescents at the intersections decorates the bronze ewer made in the year 624 (1227) by Qasim ibn 'Ali, the pupil of Ibrahim ibn Mawaliya(?) of Mosul, formerly in the collection of Brimo de la Roussilhe.

121. R. M. Riefstahl, *op. cit.*, fig. 59.

122. Fr. Sarre and E. Herzfeld, *op. cit.*, II, pp. 212 f.; also E. Herzfeld, "Der Thron des Khosrô," *Jahrbuch der preussischen Kunstsammlungen*, XLI, 1920, p. 139.

123. "Monuments et inscriptions de l'atabek Lu'lu' de Mosoul," *Orientalische Studien* (*Festschrift für Theodor Nöldeke*), Giessen, 1906, p. 201, note 1.

124. *Amida*, Heidelberg, 1910, p. 94, note 4.

125. S. Lane-Poole, *The Coins of the Turkumán Houses of Seljook, Urtuk, Zengee . . ., Catalogue of Oriental Coins in the British Museum*, London, 1877, III, p. 186, no. 529, also I. Ghalib Edhem, *Catalogue des monnaies turcomanes*, Constantinople, 1894, p. 94, no. 130, pl. V.

126. "Zwei Mosulbronzen und ihr Meister," p. 14.

127. M. van Berchem, *op. cit.*, p. 86, writes: "J'ai déjà dit que nous ne connaissons à ce jour aucun example certain d'armoiries musulmanes de cité. . . ."

128. I. Ghalib Edhem, *op. cit.*, p. 52, no. 68, pl. III.

129. For the inscriptions see *Répertoire chronologique d'épigraphie arabe*, VIII, 1937, p. 265, no. 3160; for the reproduction, R. Harari, *op. cit.*, VI, pl. 1301 A.

the moon figure is easily perceivable. It is represented as a youthful male personage seated in frontal view with crossed legs and raised arms holding a crescent around his face. It will be readily noticed that the figure differs from the known examples in its most important feature: the crescent does not frame the upper part of the body. In this aberrant form it continued to decorate some North Mesopotamian bronzes, as, for example, the base of a brass candlestick in The Metropolitan Museum of Art.[130] Thirty-six years after the date of Harari's mirror, the planetary figure appears on the coin of the Zengid prince, 'Izz al-Din Mas'ud, in its typical iconographic form which remained unchanged, except for some minor variations, during the following centuries.[131]

Of all planetary signs, only the representation of the moon was singled out to decorate the North Mesopotamian inlaid metals. This was, however, as far as the preserved material permits us to judge, not the case in Iran, where it never was depicted separately, but always accompanied by the other six signs.[132] The oldest recorded Iranian example of these signs is on the late twelfth-century ewer formerly in the collection of Count A. A. Bobrinski, and now in the State Hermitage.[133] And again we find them represented on the thirteenth-century potteries from al-Rayy and Kashan,[134] and on the silver inlaid bronze pen box by Mahmud ibn Sunqur from the year 680 (1281).[135] So much for the Iranian examples.

Coming back to the iconographic and stylistic peculiarities of the figural motif on Husayn ibn Abi Bakr's incense burner, we note first that it has been rendered in a highly unconventional manner — hence, the general discrepancy and deviation of some details from the well-established iconographic type. The crescent does not frame, as was almost obligatory, the upper part of the figure's body, but only the head from the shoulders up. Furthermore, by bringing together the points of the crescent, the craftsman has transformed it into a ring which encircles the head of the figure. Another point needs explanation: the figure is represented bareheaded with curled locks of hair falling down the sides. Is the figure intended to be a female? If so, then it is a departure from the basic conception, since the moon in Arabic is male and occurs as such with a crown or some other headgear on the objects produced in North Mesopotamia. On the other hand, the dress of the figure is that of a man. In any case, all these unusual deviations show that the artist was not bound by the prescribed iconographic norms. Now it is significant that the same unrestricted treatment of this planetary figure can be observed on some Iranian examples, particularly those belonging to the period of our artist. For instance, on an al-Rayy bowl, at one time in a private collection in New York, the figure is represented as a female with raised arms, but not holding the crescent.[136] On the Kashan bowl in the Boston Museum of Fine Arts,[137] not only has the moon

130. M. S. Dimand, *A Handbook of Muhammadan Art*, New York, 1944, fig. 87.

131. The iconographic type of seated figure holding a crescent seems to have originated under the influence of the pagan cult of the Sabians in North Mesopotamia (Harran). On the other hand, as Fritz Saxl pointed out in "Beiträge zu einer Geschichte der Planetendarstellungen im Orient und Okzident," *Der Islam*, III, 1912, p. 156, there is a certain relationship between this Islamic planetary sign and the representation of the Moon God, Mah, of the well-known silver dish found in Klimova. See I. A. Orbeli and K. V. Trever, *Sasanidskii metall*, Moscow and Leningrad, 1935, pl. 19. Regarding the subject matter, consult E. Herzfeld, "Die Sasanidsche Quadrigae Solis et Lunae," *Archaeologische Mitteilungen aus Iran*, II, 1930, pp. 128 ff. As a further suggestion, we might call attention to another representation of the moon on the silver dish with cult scene in the Bibliothèque Nationale, on which it occurs twice in the form of a crescent with an inserted bust of a masculine figure in profile. See E. Babilon, *Le cabinet des antiques à la Bibliothèque Nationale*, Paris, 1887, p. 167, pl. XLVII, or Ya. I. Smirnov, *op. cit.*, pl. XVII, no. 40; cf. also the stone relief from Hama in M. I. Rostovtzeff, "Dura and the Problem of Parthian Art," *Yale Classical Studies*, V, 1935, fig. 42. But between these non-Islamic types and those of the Islamic Middle Ages there is a gap of several centuries and the intermediary links are, as far as I am aware, not recorded. There is another representation of the moon in the form of a rounded female face framed by a crescent. Early Islamic examples of the type are unknown, but we find it in a fourteenth-century manuscript in the Bodleian Library (reproduced in E. Panofsky and F. Saxl, "Classical Mythology in Medieval Art," *Metropolitan Museum Studies*, IV, 1933, fig. 28, lower right-hand corner of the illustration) and again in another codex of the year 984 (1516) in the Hofbibliothek in Vienna (see J. von Karabacek, "Zur orientalischen Altertumskunde," *Sitzungsberichte der kais. Akademie der Wissenschaften in Wien*, 172, 1913, p. 10, note 1, fig. 2. This particular representation of the moon finds its poetical parallel in the Persian allegorical expression *mah-i char deh* (*quarta decima luna*), to which J. von Karabacek first referred (*loc. cit.*), and upon which E. Herzfeld (in Fr. Sarre and E. Herzfeld, *op. cit.*, II, p. 213, note 1) later built his famous but not convincing explanation of the planetary sign on coins and its relation to the meaning of the atabek's title, Badr al-Din. Finally, in a fourteenth-century manuscript of a treatise on astrology by Abu Ma'shar in the Bibliothèque Nationale (Arabe 2583) the moon and the sun are represented as seated female figures holding, instead of the crescent and the circle of rays respectively, rings around their faces. See E. Blochet, *Musulman Painting, XIIth–XVIIth Century*, London, 1929, pl. XXXIII.

132. The ewer in the Victoria and Albert Museum (R. Harari, *op. cit.*, pl. 1327), attributed by E. Kühnel (*op. cit.*, p. 15) to the Mosul school and by M. S. Dimand ("A Review of Sasanian and Islamic Metalwork in A Survey of Persian Art," *Ars Islamica*, VIII, 1941, p. 208) to Iran, has among its inlaid decorations the representation of the moon only, which is an indication that the piece, although of distinct Iranian shape, nevertheless was produced under strong North Mesopotamian influences and possibly by an Iranian artist in Mosul.

133. E. Kühnel, "Die Metallarbeiten," II, pl. 143, no. 3049.

134. A. U. Pope, *op. cit.*, V, pls. 656A and 713.

135. The pen box is dated as above and not 608 (1211/12) as given in W. Hartner's most interesting article, "The Pseudo-Planetary Nodes of the Moon's Orbit in Hindu and Islamic Iconography," *Ars Islamica*, V, 1938, p. 136, and fig. 14.

136. A. U. Pope, *op. cit.*, V, pl. 656A.

137. *Op. cit.*, V, pl. 713.

been personified as a woman, but also the points of the crescent which she holds join each other over her head, thus offering a parallel to that of the incense burner.

Attention is invited to the peculiar rendition of the figures' concavo-concave trunk. In this respect, they are the forerunners of the figures represented on a group of Iranian inlaid metals belonging to the late thirteenth and early fourteenth centuries. The tendency to render the seated figures (in frontal view) with concavo-concave trunks can be already observed in Iran at the beginning of the thirteenth century, if not even earlier. A conclusive example is presented by the painted figures of the bowl dated 624 (1227) on loan in the Victoria and Albert Museum.[138] There is, however, a difference between these examples and the figure of the incense burner: a difference in the dress. Instead of the traditional robe, the figure is clad in a tunic with somewhat loose sleeves, trousers, and soft half-boots. This apparent change of dress is another departure from iconographic conventionalism, but it is significant from the stylistic point of view. Similarly dressed, elongated figures occur on a group of inlaid metals manufactured after approximately the first quarter of the thirteenth century. One of the best representative examples of this group is the aforementioned candlestick found in Hamadan. Of course, there are noticeable differences between the figures of the two pieces compared, which should be attributed to the personal mannerisms and skills of their respective craftsmen. Nevertheless, the stylistic relation is apparent. From artistic as well as technical points of view, the candlestick is the work of a person who was more skilled in drawing human figures than arabesque scrolls. On the other hand, the opposite, contrasting feature is evident on the incense burner on which the arabesque devices are much more vigorously executed than the representation of the moon. One may note the naïve form of the figure's head.

The suggestion that the artist of our incense burner, Husayn ibn Abi Bakr, was an Iranian active in North Mesopotamia thus finds its confirmation also in the ornamental decoration of his work. But it can be questioned why the North Mesopotamian ornamental elements found on the incense burner could not have been introduced to Iran, as Iranian elements were introduced to North Mesopotamia. To believe that the movement of artistic influences still continued to flow during the catastrophic years of the Mongol invasion from the countries situated to the west of Iran to such devastated centers as al-Rayy or Nishapur is to neglect the actual conditions prevailing in that country. During the period from 1220 until about 1256 there could be no normal relations in artistic or any other cultural fields. It was after the relative peace and order established during the reign of Hulagu that the cultural life of Iran resumed its normal course of development, and that relations with neighboring western countries were restored. On the other hand, the same Mongol invasion and the resulting instability of social order caused an emigration of artists. With them went the artistic principles which were responsible, to be specific, for a sudden flourishing of the art of inlaid metals in North Mesopotamia.

The number of known incense burners of our type actually produced in Iran is small: there are recorded at present but one "intact" and two fragmentary pieces. One of these fragments, the lower part of an incense burner in a private collection in New York (Fig. 17), shows that the type was adopted by the Iranian metal workers in its original shape. Unfortunately, the cover of the piece is missing,[139] but in all probability it was of the usual domed shape with a surmounting knob. Distinctly Iranian are the ornaments and their disposition. Bordered by loosely twisted double-strand bands, the burner shows three round medallions of interlaced geometrical pattern. These alternate with three elongated shields. The shields have concave ends, and they are filled with delicately drawn scrolling stems, which carry palmettes in symmetrical, circular arrangement. Small palmette devices are also inlaid on the upper parts of the feet. It is interesting to note that the medallions and the bordering bands are perforated. None of the above-discussed incense burners has perforations on the body. They are unnecessary because the receptacle for the incense is always placed on the upper level, immediately under the cover, which is always perforated.

The alternation of round medallions and elongated shields with concave ends is typical of the Iranian metals of the Seljuq period. They are engraved in identical arrangement on the silver bottle inscribed with the name of a certain Abi 'Ali Ahmad ibn Muhammad ibn Shadan, and on the silver plate made for the daughter of a Turkish nobleman, 'Izz al-Din Önör.[140] Both pieces can be attributed to East Iranian ateliers. Such forms are also engraved on the unpublished bronze mortar of unusual shape in the collection of D. K. Kelekian, presently on loan in the Arab Art Museum in Cairo. Of Iranian style are likewise the palmettes of scrolling stems which are inlaid on a background

138. D. K. Kelekian, *The Kelekian Collection of Persian and Analogous Potteries*, Paris, 1910, pl. 39.

139. In Ph. Ackerman's *Guide to the Exhibition of Persian Art*, p. 458, no. W, this incense burner has been described as having a "domed cover." The cover, which was removed at my suggestion, did not belong to the piece, but to a twelfth-century inkstand of the well-known type (see G. Migeon, *L'Orient musulman*, pl. 17, no. 80). Moreover, it could not have belonged to the incense burner because it is not perforated, and was, furthermore, hinged at the wrong place.

140. Both vessels are in the State Hermitage. See Ya. I. Smirnov, *op. cit.*, pls. LXXXII, no. 147, and LXXXIV, no. 151. For the inscriptions, see M. van Berchem, "Inscriptions mobilières arabes en Russie," *Journal asiatique*, XIV, 1909, pp. 406 and 410 f.

FIG. 13. New York, Metropolitan Museum: Incense Burner, Syrian, First Half of the XIVth Century (Courtesy of The Metropolitan Museum of Art)

FIG. 14. London, Victoria and Albert Museum: Incense Burner Made for the Mamluk Sultan Malik Nasir Muhammad ibn Qalawun, Egyptian, First Half of the XIVth Century

FIG. 15. New York, Formerly Collection J. P. Morgan: Incense Burner by Husayn ibn Abi Bakr Sinni-i Razi, First Half of the XIIIth Century

FIG. 16. Inscription on the Cover of the Incense Burner Reproduced in Fig. 15

FIG. 17. New York, Private Collection: Lower Part of an Incense Burner, Iranian, First Half of the XIIIth Century

FIG. 18. Paris, H.-R. d'Allemagne Collection: Incense Burner, Lower Part, Iranian, XIVth Century; Cover, North Mesopotamian, XIIIth Century

FIG. 19. New York, Private Collection: Lower Part of an Incense Burner, Iranian, XIVth Century

of engraved, minute spirals.[141] Considering the type of palmettes in particular, and the medallion and shield composition in general, one is justified in placing this fragmentary incense burner in the first half of the thirteenth century, i.e., in the period preceding the Mongol invasion.

Figure 18 reproduces an incense burner, the lower part and the attached cover of which do not, however, belong to each other. These pieces, in the collection of H.-R. d'Allemagne, are said to have been found in Khorasan.[142] The lower part shows a slight deviation of shape in that the feet are not attached directly to the cylindrical body, as is the case with pieces of Syrian and North Mesopotamian origin, but, instead, to a rather wide flange added to the lower end. Whether this addition of the flange constitutes a peculiarity of Iranian incense burners is difficult to determine with certainty. It appears on the fragment reproduced in Figure 19, although its presence can be observed also on the incense burner recorded by E. Kühnel (Fig. 5).[143] The decoration of the piece suggests its fourteenth-century origin, and consists of leafy, undulating scrolls and bands of beads forming medallions each of which encloses a large full-palmette. The design was probably inlaid with silver. The cover, as can be readily observed from the reproduction, belonged to an incense burner of a different period and style. Its silver-inlaid T-fret pattern, meander band, and the perforated arabesques filling the round medallions are, both in individual forms and in compositional interrelation, typical of the works of Mosul. Hence the cover must be of thirteenth-century North Mesopotamian origin, a fact which has remained unnoticed up to the present.

We shall close our discussion with a brief description of the lower part of a fourteenth-century incense burner in a private collection in New York (Fig. 19). Inlaid with silver, its decoration consists of five round medallions occupied by seated musicians playing flute and tambourine, represented in side view.[144] Between the medallions are symmetrically composed scroll devices carrying leaves. Bands of undulating stems with leaves complete the decoration of the body. Similar stems occur also on the feet. The flange with projections shows a loosely twisted double-strand interrupted by heart-shaped knots carrying leaves. The projections at the joining points of the feet are reminiscent of bird heads which occur at the same place on some tripod bases of stands.[145] Further inlaid ornaments decorate the inside of the receptacle, among which are seven disk rosettes, a motif which for several centuries persistently occurred on Iranian metalwork.[146]

How long incense burners of this type remained in production in Iran is difficult to determine. Iranian book paintings which occasionally offer a clue to the shape of various vessels are of no aid. In the paintings of the famous Uighur *Mi'raj Nameh*, from the year 840 (1436), in the Bibliothèque Nationale, we find the representation of an incense burner which, in its shape, is not related to those discussed here. It has a cylindrical body; the four feet form trefoiled arches; and the conical convex-fluted cover has a pointed knob.[147] It is quite possible that with the beginning of the Timurid period, when the arts and crafts in Iran underwent fundamental transformation, the type was abandoned to give place to the one depicted in this miniature.

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141. These spirals are identical with those of lustered Kashan potteries.

142. H.-R. d'Allemagne, *Du Khorassan au pays des Bakhtiaris. Trois mois de voyage en Perse*, Paris, 1911, II, p. 70.

143. The flange, of similar shape, is a characteristic part of tripod stands produced in Iran and elsewhere. For examples of such stands see R. Harari, *op. cit.*, pl. 1284, and G. Wiet, *op. cit.*, pl. XXV.

144. Identical figures decorate the silver-inlaid casket in the Victoria and Albert Museum, reproduced by R. Harari, *op. cit.*, pl. 1359.

145. M. Aga-Oglu, "Some Islamic Bronzes of the Middle Ages," *Bulletin of the Detroit Institute of Arts*, XII, 1931, p. 91, fig. 4.

146. All my efforts to locate the cover of a bronze incense burner, presumably excavated at Hamadan and formerly in the collection of A. Kann, were without results (*The Alphons Kann Collection*, sale catalogue of the American Art Association, Inc., New York, 1927, no. 295). Any information concerning the whereabouts of this cover will be highly appreciated. Another cover with silver inlay and Arabic inscription, found in Samarqand, is listed in the catalogue of the Leningrad exhibition of Iranian art (*op. cit.*, p. 363, no. 8).

147. E. Blochet, *op. cit.*, pl. LXXX.

THE SECRET OF THE MEDIAEVAL MASONS

PAUL FRANKL

WITH

AN EXPLANATION OF STORNALOCO'S FORMULA

ERWIN PANOFSKY

". . . Deo teste, si melius scirem cordialiter adimplerem."
Stornaloco.

1. Ad Quadratum et ad Triangulum

The mediaeval masons were called "free masons" since they were not bound to a guild in any specific city. Their vocation forced them to wander from place to place where churches were erected and stone masons were needed. Thus they were "free" and had the character of an international society. The same Italian stone masons worked at Speyer in Germany and at Lund in Sweden; French stone masons worked in Germany, and so on. They were nevertheless regionally organized. Only in Germany had an organization been fully developed. Four major lodges became the centers for the smaller ones: Strasbourg, Cologne, Vienna and Bern. In these places disputes were settled by the head master, for the guild had its own jurisdiction. A court was needed for final decisions and this honor was bestowed on the lodge of Strasbourg probably as early as the time of the erection of the nave of Strasbourg Cathedral in the second half of the thirteenth century.[1]

All these lodges had their written rules which probably slowly became unified. In Germany this unification was accomplished when the representatives of nearly all lodges of Germany, including those of Switzerland and Alsace, held a common session in Regensburg in 1459. The rules defined at that meeting were later confirmed by Emperor Maximilian I in 1498.

From this document of 1459 we know not only that there was a secret but also to what it referred. Paragraph thirteen says: "Also no workman, nor master, nor parlier, nor journeyman shall teach anyone, whatever he may be called, not being one of our handicraft and never having done mason work, how to take the elevation from the ground plan."[2] There were still other secrets but they were intended to preserve this main one intact. It was the master's duty to keep the book of the lodge and to have it read to the masons every year. The journeyman who was promoted had to take an oath not to reveal to anyone the secret salutation, etc.

Secrets arouse curiosity. We want to know what this sentence means: "to take the elevation from the ground plan." But there is no need to guess for ourselves. Only one generation after the great session of Regensburg the master of the cathedral of this Bavarian town, Matthäus Roriczer, published the secret in a small booklet with the consent of the bishop of Regensburg.[3] Roriczer probably had been

1. Ferdinand Jenner, *Die Bauhütten des deutschen Mittelalters*, Leipzig, 1876, p. 44, gives 1277, accepting the statement of August Wilhelm Müller, in J. S. Ersch and J. G. Gruber, *Allg. Encyclopädie* . . ., Leipzig, 1849, XLIX, p. 57, *s.v.* Freimaurerei. Müller does not disclose his source.

2. Jenner, *op. cit.*, p. 255, Article 13, "Es sol kein Werkman noch Meister noch Parlierer noch Geselle, niemans, wie der genennd sige, der nit unsers Hantwerks ist, us keinem uszuge unterwisen us dem Grunde zu nemen: der sich Steynwerks sin tage nit gebrucht hett." Parlier or Parlierer was the title of the journeyman or master who was the leader of the masons on the working lot; he had to mediate between the architect and the masons and therefore to talk, *parler* (French). The German word "Grund" means what is today called "Grundriss" (ground plan).

3. Matthäus Roriczer, *Dz puchlī d fialī gerechtikeit*, Regensburg, 1486. In this case "Gerechtigkeit" does not mean justice, but correctness. Roriczer died in 1492; cf. Thieme-Becker, *Allg. Lexikon der bild. Künstler*, XXXVIII, p. 593.

present at the meeting of 1459, but he had not signed the stipulations. At about the same time an architect living in Nuremberg published the secret in a still smaller booklet. He probably knew the publication by Roriczer.[4] Therefore he who wishes to know the secret of the free masons needs only to study these two books. Roriczer's shows how the elevation of a pinnacle may be derived from the measurements contained in the ground plan. It is clear that this is the special case of a general method. He who has learned to find the measurements for a pinnacle is able to apply the same method to other Gothic details. But after the new edition by Heideloff,[5] the modern scholars of the nineteenth century who read Roriczer's booklet did not recognize that it revealed the secret of the masons and that it illustrated a general method; they saw only an elementary prescription for drawing a pinnacle and a gable of late Gothic style.

Why should this special form which Roriczer constructed have had any value as a norm, since everybody knows that there are thousands of pinnacles and gables of very different forms? Roriczer was not a great writer. Although he surely was clear in presenting his method to the mediaeval reader, he was silent about the reason why he used precisely that method and no other one. This made him incomprehensible to modern readers.

Every mediaeval mason, however, knew and understood the reason. But when the Renaissance replaced Gothic style, new methods of drawing were introduced, and the understanding of the "secret" was gradually lost. As the sociological position of the architects changed, the lodges became less important. In Germany the whole organization survived by the inertia of conservativism until Strasbourg was conquered by Louis XIV in 1681. The German lodges of Cologne and Vienna were dissolved in 1707 because the *Reichstag* saw in their continuing relation to Strasbourg a political danger to the security of the Reich. The lodge of Strasbourg remained in existence, until it too was dissolved in 1771. The lodge of Bern seems to have automatically lost its functions, because with the end of the Gothic style there was no longer any secret; it had been supplemented by the publications of Alberti, Vignola, Palladio and others.

Thus the lodges seemed dead but they retained certain traditions. The intrinsic secret was still known but it had become almost useless in practice. The extrinsic secrets, such as the salutation, the handshake, etc., remained. Some of these were taken over by the modern freemasons. This secret society of the eighteenth century had no use for developing the measurements of the elevation from a ground plan; it attempted rather to strengthen individual ethics. Its connection with the old guild of the free masons of the Middle Ages is understandable when one studies the rules which prescribed behavior according to strict Christian morals. But the new freemasons, as everyone knows, veiled their honest aims by mysterious rites far more than did their predecessors.

It is useful to remember that in 1771, when the lodge in Strasbourg was dissolved, the young Goethe wrote in this same town his essay on the cathedral of Strasbourg.[6] Later on he almost disavowed his first enthusiasm and became the champion of classic architecture. He returned to an appreciation of Gothic only in his old age, when the Romantics undertook the earnest study of Gothic buildings. But all the Romantics who admired the Gothic style and searched for the great secret, had grown up in the classic tradition of the Renaissance and its esthetics. Impregnated with the theory that beauty is dependent on proportions, they concluded that the secret could be nothing else than a certain proportion. The mediaeval tradition persisting through the Renaissance suggested simple regular figures as key figures of proportions. These were the square ("Vierung"), the equilateral triangle, the octagon ("Achtort") and the eight-pointed star developed from the regular octagon. Two early Romantics, Stieglitz and Boisserée, surrounded and endowed these figures with the nebulous glory of extremely remote wisdom.[7] The genuine Romantic of any epoch wants to perceive that a certain direction leads toward a goal but he does not want to reach the goal itself. A secret never to be revealed enchanted the minds of these poetical scholars. Their intention was to have the secret of the masons remain a real secret forever.

Certain followers of the Romantics not only believed in this secret but tried to unveil it. In so doing they were less romantic concerning the final objective but they were still more romantic and mystic in their method. They continued to construct geometrical figures; not only those which were transmitted from the Middle Ages, but also new ones derived from the old figures, invented by marvelous assiduity and imagination. Some of these figures are so complicated

4. Hanns Schmuttermayer's book was published by A. Essenwein, in *Anzeiger zur Kunde der deutschen Vorzeit*, Nuremberg, new ser., XXVIII, 1881, p. 65 (Schmuttermayer's Fialenbüchlein).

5. Carl Alexander von Heideloff, *Die Bauhütten des Mittelalters in Deutschland*, Nuremberg, 1844.

6. Johann Wolfgang Goethe, *Von deutscher Baukunst*, Hamburg, 1773; reprinted in most editions of Goethe's works. Written in 1771, it was published by Johann Gottfried Herder in his pamphlet: *Von deutscher Art und Kunst. Einige fliegende Blätter*, Hamburg, 1773; a very good commentary in Kürschner's *Deutsche National-Litteratur*, CVII, Stuttgart, 1892, p. 173, written by Georg Witkowski.

7. Christian Ludwig Stieglitz (1756–1836), *Von altdeutscher Baukunst*, Leipzig, 1870. Sulpiz Boisserée (1783–1854), *Histoire et Description de la Cathedral de Cologne*, Stuttgart, Paris, 1828, p. 22; and the second edition published in German language, *Geschichte und Beschreibung des Domes von Köln*, Munich, 1842, p. 36. The latter is enriched by a discussion of the proportions of the Greek theater according to Vitruvius, V, 6.

and dense that by them one can prove nearly everything. The network of their lines is arbitrary; we have no proof that such networks ever were known to mediaeval designers or that they were used by mediaeval builders. Still more arbitrary was their application by the modern Romantic inventors to mediaeval buildings of which only the most inexact representations were available. This branch of fictitious science thus discredited further investigation of the secret of the masons.

It is not astonishing that opposition arose relatively early. It began with Schnaase[8] who insisted that all art is at root a secret and has to remain a secret forever. Art is the result of individual talent and irrational feelings; and not of rational rules which, once found, would enable every bungler to create art. Put in this way the dispute has a long history in the theory of design. One may quote Federico Zuccari's doctrine, taught at the end of the sixteenth century and published in 1607, that drawing is of divine origin, a gift of God's grace.[9] The followers of this creed in the nineteenth century ridiculed, or at best ignored the Romantic belief in nets of lines which were without any beauty beside their modest beauty of regularity, and whose power to create beauty could never be explained in a rational way. Both parties, fighting each other throughout the entire remainder of the nineteenth century and up to our own day, were nevertheless united on one point. They agreed in postulating that the secret of the masons was a magic formula of geometrical lines which guaranteed beauty. But they continued to be opposed on another point: one faction believed in the secret as in a truth, and the other insisted that it was a kind of superstition.[10]

The first to recognize that the equilateral triangle had some practical use beyond its esthetic meaning was Dehio. He proved that it can be construed as governing all decisive dimensions in the ground plans and elevations of the cathedrals of Chartres, Reims, Amiens, Cologne and Beauvais. This should have been convincing to his contemporaries, but it made no impression because no one could understand why these triangles which are clearly seen in red lines in Dehio's illustrations but not at all in reality, should have had any effect on the esthetic value of the buildings. On the other hand, his suggestion that the triangles may also have had practical uses was not convincing because Dehio was by no means explicit. He guessed that the reason for the lack of all exact architectural drawings of mediaeval buildings before the thirteenth century — excepting the plan for St. Gall — was that such drawings were never made. He adds, "It is certain that the old masters were able to use the compass and the ruler, but there is doubt about the yardstick."[11] Did they have no yardstick? Dehio does not answer this question. If they had no yardstick, was this the reason why the architects made no drawings? And is it true that they made no designs? How could anything be built without drawings? Dehio seems to have had a faint idea of the correct solution to the whole problem; but he was too much attached to the old idea that triangles guarantee beauty, to attain a clear notion of the practical uses of the triangle.

The first who bluntly stated that the equilateral triangle had been used by the mediaeval architects and masons merely as a practical device "without any thought for its esthetic effect" was Drach.[12] That he held the clue to the masons' secret is evident from his remark that where measurements in Gothic buildings are not commensurable, we must assume that they were established by the geometrical method. But he gave no clear explanation and believed strongly in the universal adaptability of the so-called $\frac{\pi}{4}$ triangle which he introduced.[13] He quoted the note of Dehio to the effect that it is doubtful whether the old masters were able to use the yardstick. After Drach, decades elapsed before students were emancipated from the esthetic idea of the triangles.

The way to a deeper understanding of the problem was opened in 1925, when Kossmann[14] showed that the Cistercians used a measure for their working plans which he called

8. Carl Schnaase, *Geschichte der bildenden Künste im Mittelalter*, Düsseldorf, 1871, II, p. 223; I am quoting the second edition, but the text is the same in the first edition of vol. IV, 2, of 1853, which I do not have at hand.

9. Not having the work of Federico Zuccari at hand I refer the reader to Erwin Panofsky, *Idea*, Leipzig, Berlin, 1924, pp. 47 ff.

10. The references to this large literature will be given in a book upon the literary sources of Gothic architecture which I am preparing.

11. Georg Dehio, *Untersuchungen über das gleichseitige Dreieck als Norm gotischer Proportionen*, Stuttgart, 1894, p. 20. "Dass die Alten mit Zirkel und Lineal geschickt umzugehen wussten, ist gewiss, ganz zweifelhaft aber, wie es mit der Anwendung des Massstabes stand. Wenn schon bei der Abmessung am Bau Irrtümer — man weiss wie grobe oft — an der Tagesordnung waren, wie viel schwerer muss es da gewesen sein, brauchbare Massstabszeichnungen im Kleinen zustande zu bringen. Operierte man aber mit einem im Gebäude selbst liegenden Massstab, einem Modulus — als welchen man das gleichseitige Dreieck in der gedachten Verbindung sehr wohl bezeichnen darf — so konnte man schon aus der Skizze die richtigen Masse entnehmen, so war für den Fall zeitlicher Unterbrechungen die Einheit der Bauführung besser gesichert u.s.w. Doch bleiben das alles Vermutungen."

12. C. Alhard von Drach, *Das Hüttengeheimnis vom gerechten Steinmetzengrund . . .*, Marburg, 1897, p. 5 (Drach in this title uses the old expressions, which in modern German would be "vom richtigen Grundriss für Steinmetzen"). "Wir halten es für höchst wahrscheinlich, dass so die Triangulierung aus Zweckmässigkeitsrücksichten zunächst in der Praxis benutzt worden sein mag, ohne jeglichen Gedanken an ihre ästhetische Wirkung, da, um eine solche zu erzielen, die bereits erfolgte Ausbildung zum systematischen Verfahren vorausgesetzt werden muss."

13. *Op. cit.*, p. 6. The $\frac{\pi}{4}$ triangle is the isosceles triangle, with the apex of 45° derived from the regular octagon by drawing the diagonals through the center.

14. B. Kossmann, *Einstens massgebende Gesetze bei der Grundrissgestaltung von Kirchengebäuden* (*Studien zur deutschen Kunst-*

a great unit, "grosse Einheit." In many buildings it is seven feet long, in others it is only five feet. Its length depends on the length of the foot conventionally used in the region where the work was being done. Kossmann proved his discovery by several examples without hinting at any connection of the "great unit" with beauty, but he refrained from giving any other plausible explanation for its use. He simply stated the fact, and, without explanation, a fact remains merely a fact, advancing our knowledge only quantitatively, not qualitatively.

The explanation was given four years later in 1929, by Durach,[15] who took up a remark by K. Witzel. As early as 1914 Witzel seems to have repeated the doubt whether the use of drawing to a definite scale was known in the time of Gothic building.[16] Durach called attention to the importance of the yardstick. Today every architect, engineer, mason or carpenter carries this tool in the back pocket of his trousers. All these yardsticks are equal in most parts of the world; in others the meter is the standard. In both cases these instruments are available for a small sum in thousands of shops. Thus the presupposition exists that everybody can translate a drawing of a certain scale, say 1:100 or 1:50 or 1:20 to the real size of 1:1. This presupposition did not exist in mediaeval times. The length of the foot or other units varied from region to region. The mason would have had to have his footrule cut whenever he arrived at a new place. There was no factory producing footrules that could be folded and put in one's pocket. Indeed most of the mediaeval drawings for architecture since the thirteenth century were made without scale. Well known examples are the sketches of Villard de Honnecourt. Thus, a method had to be developed which enabled the mason to translate the small sketch of the architect into the real size without any scale. This does not mean that the use of a scale was totally unknown. Jenner quotes a poem which contains the two lines:

Der Mosstab hat Kunst manigfalt
Wird auch gebrucht von jung und alt.[17]

It does not matter that this poem cannot be dated exactly and may be of very late time, because the knowledge of the yardstick does not predicate its use for architectural drawings at a certain scale.

Given the knowledge that the lack of the yardstick made

geschichte, no. 231), Strasbourg, 1925. For a single building, S. Cunigunde in Rochlitz, Saxony, the great unit was recognized by Stieglitz without understanding of its real meaning; cf. Jenner, *op. cit.*, p. 235. Another example was given by Jenner himself, the Dominican church in Regensburg, *op. cit.*, p. 237.

15. Felix Durach, *Mittelalterliche Bauhütten und Geometrie*, Stuttgart, 1929.

16. K. Witzel, *Untersuchungen über gotische Proportionsgesetze*, Berlin, 1914. I could not obtain the book by Witzel and am citing it from Durach's book (p. 21). It seems that Witzel was clearer than Dehio concerning the scale.

17. Jenner, *op. cit.*, p. 239. The two lines may be approximately translated: "The scale gives different kinds of advantage (and) is used also by young and old persons." "Kunst" means "technics" in mediaeval German, and not what "Kunst" means today. One may even translate "Kunst" by "trick."

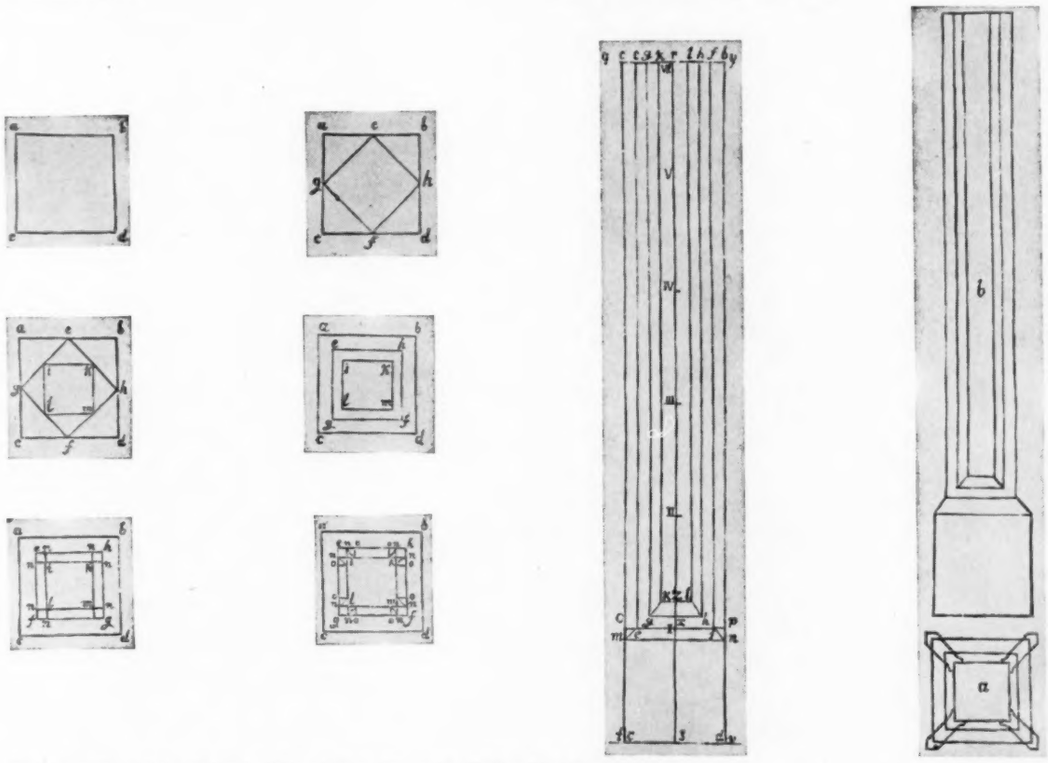

FIG. 1. The Main Steps in Drawing a Pinnacle Following Roriczer

a method necessary to translate sketches into working size, we are able to view Roriczer's booklet in a new light. What does he actually teach? Firstly, to make a pinnacle the mason has to draw a square (Fig. 1). He must then divide the sides in two equal parts and join the dividing points, thus obtaining a second smaller square athwart the first. The length of the sides of the second square is half that of the diagonal of the first. The mason must now turn the second square through 45° so that its sides are parallel with those of the first square. This is the main operation, which the mason repeated in order to obtain a third and even smaller square. If now the sides of the third square are prolonged until the sides of the next larger square are reached, four smallest squares take shape, and by a few additional constructions which can here be omitted, the ground plan of the pinnacle is nearly finished. To find the ground plan of the crowning flower, a big square must be drawn athwart the main axis.[18] The ground plan thus consists of various horizontal plane sections at different levels all projected on one plan.

To take the measurements from the ground plan ("den Uszug us dem Grunde zu nemen") thus has two meanings. The designer not only uses orthogonal projection to draw the plan and the elevation in clear geometrical relation, but he also literally takes all important measurements which occur in the elevation from the ground plan. For example, the body of the pinnacle must recede behind the vertical plane of the pedestal. To the masons' question of how much recession to give the pinnacle, Roriczer gives the answer that the recession was defined by the difference between the second square and the first.

The modern architect, on the other hand, with his modern yardstick and scale, decides this question independently of reference to the mediaeval masons' limitations. The modern architect is not concerned to know whether the height of his pinnacle is commensurable with the length of the side of the first square *a b*. He decides upon the ratio by individual esthetic feeling. But the mediaeval architect had to choose measurements which his mason could execute without yardstick. In the case of a pinnacle the mason who had finished the pedestal could construct the amount of receding of the main body directly upon the upper surface of this pedestal. He did not need a paper or a wooden board; what he had to do was extremely simple: he marked the diagonals and conveyed half of the length of the side four times at the diagonals starting from the center. He was not concerned with the special size of the pinnacle because the scale of every profile always changed proportionally with the given basic dimension. Thus the mason had only to learn the key figure of the two squares and some minor prescriptions which changed from case to case. The secret the mason had to learn was the key figure which the architect had used; it may have been these two squares or some other simple figure, and he had to learn how to use them himself.

Another important passage in Roriczer's text refers to the "Massbretter," that is to the stencils. We saw that the body of the pinnacle should have a receding profile. To carve it the mason needed a model of wood, or template, which is the negative of the finished form. The measurement or the measurements of this "Massbrett" (literally it would be translated as "board of measure") could be derived from the ground plan. Other "Massbretter" were needed to chisel out other forms of the pinnacle and the gable in Roriczer's example. In these matters Roriczer is very laconic and one must know something about the theory and the practice of mason work to understand the deeper meaning of his text. The readers of his generation surely had this knowledge.

In brief, the mason had to guard the secret so that no outsider could compete. Knowledge of the most elementary rules of geometry was not universally widespread in mediaeval times. Only those who had been educated in the seven *artes liberales*, including the *ars geometriae*, possessed any mathematical culture. Such liberally educated men were not, for the most part, supposed to become competitors of the masons, because they conformed to another standard. But it may be noted that even these men of education could not translate a small sketch into working size unless they were admitted to the secret.

In summarizing we may say that the proportion was used as a practical device to compensate for the lack of the yardstick. Durach rightly stated that following Drach one used "die Möglichkeit einer variierenden Proportionierung nach mathematischer Gesetzmässigkeit. . . . Die Übereinstimmung zwischen den Entwurfszeichnungen und der Bauplatzkonstruktion bestand darin, dass der Baumeister beim Zeichnen dasselbe Proportionierungsprinzip anwandte, wie er es mit seinen Leuten auf dem Platze, nur eben in natürlicher Grösse, praktizierte."[19] Drach was also right in assuming that the choice of the proportion was not governed by its beauty, but by its simplicity for ever-renewed execution in different sizes. One has only to be conscious that the beauty of the form could be independent from the special choice of the key figure, including the choice of the proportion, and that, nevertheless, there

18. The turning of the crowning flower at 45° is characteristic of the late Gothic style of Roriczer's time. In the thirteenth century the pupil would have been advised to place the flower frontally. It may be that the idea to turn parts of the details and whole elements of the construction (piers and even whole towers) athwart was suggested by the continued use of these athwart squares in the ground plan. But this turning would never have been accepted had it not been desirable for purely stylistic reasons.

19. Durach, *op. cit.*, p. 22.

could be a relation of the method as a whole with some principle of esthetic. This problem may be postponed to the end of our investigation. There are still other problems which we have to solve before we are ready to approach that last and deepest one.

Limiting our attention for the moment only to the method of "two squares" of Roriczer and the "great unit" of Kossmann, we must acknowledge that they are of totally different character. The proportion of the side of the small square to that of the bigger one is $1:\sqrt{2}$, an irrational proportion which could not be calculated by arithmetic in mediaeval times and had to be constructed by geometry. In contradiction to this fact the "great unit" of five or seven or more feet is a measure of rational numbers. Roriczer's squares and the great unit are indeed totally different methods: the great unit supplemented the lack of the yardsticks only insofar as it gave the architect and parlier a convenient measure.[20] This could be made as a wooden lath and then used to strike off the large distances, such as widths of aisles, the height of the piers and the main points or lines of the elevation.[21]

But relations exist between both methods and it is now our task to enter more deeply into the historical study of what was really done in Gothic times. I leave to others the necessary investigation of the buildings themselves. They may find out, equipped with the knowledge of the so-called secret, what kind of key figure was used in any special case. They may also find out by measuring, as Kossmann did, what kind of great unit was used. Others may investigate the smaller details and determine whether, in a given case, the square of Roriczer or another figure really were guiding lines. We shall attack the problem in another way: by the interpretation of the written documents referring to the measurements of buildings. There will not be many. The most promising sources pertain to the cathedral of Milan. I shall try to interpret a part of these documents in the following lines.

20. The conventional measure of the foot had to be used at the beginning of the work and possibly sporadically during the construction, but not continually.

21. Such a wooden lath is mentioned by Ezekiel in his vision of the temple, XL, 3 and 5: ". . . there was a man . . . with a line of flax in his hand and a measuring reed . . . and in the man's hand a measuring reed of six cubits, long by the cubit and an hand breadth. . . ." According to Joh. Haase, "Das Werkmass in der Tektonik der antiken Völker," *Zeitschrift für Geschichte der Architektur*, V, 1911, p. 251, two kinds of cubits existed in Egypt, the little cubit of six hands breadth and the royal cubit of seven hands breadth. A cubit is "a measure of length, in its origin the length of the forearm, from the elbow to the extremity of the middle finger." (Webster's Dictionary.) The royal cubit was between 52.3 cm. and 52.7 cm. Therefore the architect in Ezekiel's vision had a lath or "great unit" of six royal cubits. This lath had a length of at least 3.138 up to 3.162 m. Ezekiel wrote after 597 B.C., the year he was carried off to Babylon by Nebuchadnezzar.

2. The Measurements of the Cathedral of Milan

The cathedral of Milan was begun in 1386.[22] The name of the first architect who made the designs and a model has not been handed down to us. It is hardly imaginable that this model was not made to a definite scale. But if this was the case the problem remained how to translate its dimensions without a yardstick into the working size. This model was valid until 1391. The ground plan of the existing building, therefore, still reveals the first design, which was proportioned *ad quadratum*.

The piers, measured from center to center, are 16 braccia apart in the longitudinal direction of the building.[23] Transverse distances between piers are also 16 braccia. The width of the middle nave is 32 braccia and the total width of the edifice, measured between the outermost walls of the church, is therefore 96 braccia (namely 32 plus four times 16). We conclude that the great unit used by the first architect contained 8 braccia. Since one *braccio Milanese* is 59.5 cm.,[24] the great unit must have been a wooden lath 4.6 m. long, which is still a convenient instrument, when it is used by two workers each holding an end.

The proportions of the elevation shown by the model were changed in execution after 1391, but we are in the happy position of knowing the measurements of the lost model. In 1390 Antonio di Vicenzo, the architect of San Petronio in Bologna, was sent to Milan to study this new undertaking. We are inclined to believe that he could not learn much from it for his own church, because both buildings are so different. In any case, San Petronio is an historical proof for the use of the equilateral triangle.[25] But it may be asked whether the elevations of the cathedral of Milan were originally developed from equilateral triangles as shown in the famous design by Cesariano in his commentary on Vitruvius.[26] We are compelled to give a negative answer, thanks to the sketch by Antonio di Vicenzo which is still preserved (Fig. 2). It is a valuable document, although it is partly wrong, partly incomplete, and partly unclear. This sketch was published by Boito.[27] It shows the eastern part of the cathedral as it existed in 1390, but Antonio by mistake added a bay to each end of the transept. Furthermore the sketch presents the section of the nave with its five aisles, following the original design of the model. Antonio's section notes the heights in braccia:

22. Camillo Boito, *Il duomo di Milano*, Milan, 1889, p. 49.

23. One braccio is about two feet.

24. *Enciclopedia italiana*, VII, Milan, 1930, *s.v.* "braccio," p. 649.

25. Georg Dehio, *Die kirchliche Baukunst des Abendlandes*, II, Stuttgart, 1901, p. 228.

26. Cesare Cesariano, *Di Lucio Vitruvio Pollione De Architectura libri decem traducti de Latino in Vulgare . . .*, Como, 1521, p. XV verso.

27. C. Boito, *op. cit.*, p. 115.

the height of the piers at the walls	M	30 braccia
the height of the piers in the side aisles	L	40 braccia
the head-pieces of the piers	H	10 braccia
the height of the impost-line in the central nave was		60 braccia

The sketch by Antonio shows two other measurements. The first of these, F = 3 braccia, should not be added to the 60 braccia in order to reach the impost of the vault, as

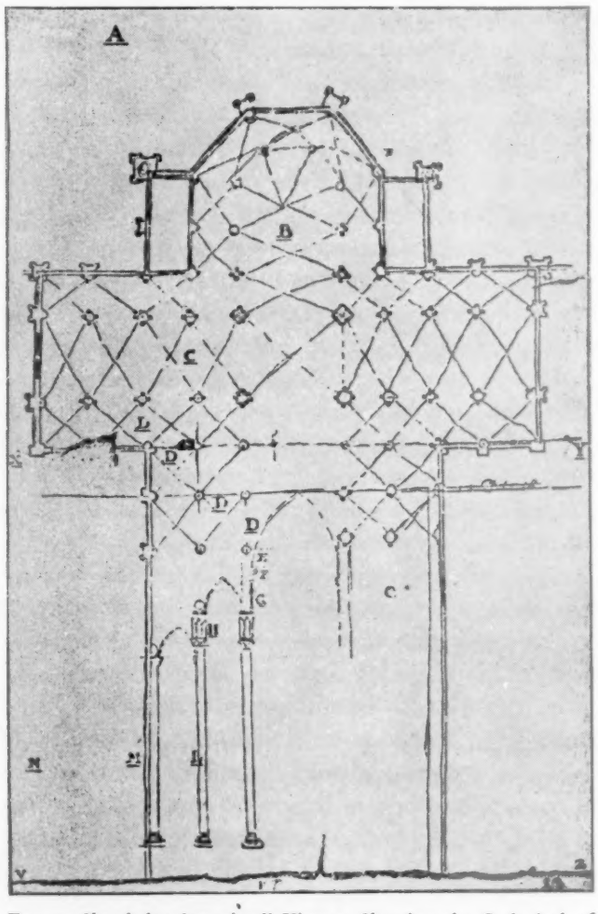

FIG. 2. Sketch by Antonio di Vicenzo Showing the Cathedral of Milan in 1390

Boito believed. It most probably marks the point on the outside where the roof over the side aisles should rest. For the letter E = 6 braccia, Boito had no explanation. It could refer to the sill of the clerestory windows. We must not concern ourselves too much with these two measures, since the height of the vault in the central nave, measured from the impost to the summit, is more important. This measurement was omitted by Antonio. But if one assume the heights of the head-pieces of the piers (intended for decoration with statues) as showing the length of 10 braccia, the height of the vault, from impost to summit, may be estimated as 30 braccia. It will be objected that Antonio's freehand sketch is by no means reliable for such estimates. The proportion of the whole is obviously too steep. But this fault is restricted to the elongation of the piers.[28] It was easier to draw by the eye the right proportion for the shorter measurements of the head-pieces and the transverse arch. For this reason we are justified in believing that the height of the vault was intended to be 30 braccia. The summit of the vault was then only 90 braccia over the floor and not 96. Boito was therefore wrong in believing that the first draft of the section was designed *ad quadratum*. Nor was it designed *ad triangulum*. This does not mean that the proportion was irrational; on the contrary, the main measurements: 30, 40, 50, 60, and 90, clearly prove that the first architect provided a "great unit" of 10 braccia for the elevation. It may well be that instead of a lath of 10 braccia he used one of only 5 braccia (2.975 m.), as being handier and leading to the same result.

When Antonio was in Milan the cathedral was under the direction of a French master. In sad contrast to his happy name, Nicolas Bonaventure encountered pecuniary embarrassments and suddenly fled in 1391. He left Milan before the height of the outer walls and of the piers of the side-aisles was completed. It may be assumed that the dispute about the heights had already arisen at the time of his presence. There were those who held the proportions were too steep and did not conform to the Lombard tradition. When Bonaventure had gone, the building committee decided to change the height of the central nave. But this could not be done simply by reducing one isolated measurement. In consequence the impost line had to be lowered as well as the other points, for they were all interconnected. It seems that the committee agreed to reduce the proportion by using the equilateral triangle. This invoked another problem: whether one could still use the specified great unit of 10 braccia. Of course one could not. Strangely enough, one fact was forgotten by all modern scholars — except Beltrami and Boito — who wrote about the use of equilateral triangles in mediaeval designs, and who constructed them in their own drawings. The height of a regular triangle is not commensurable with the side. The height is irrational for the arithmetician, being $\frac{1}{2}\sqrt{3}$ if the base is taken as the unit; or $\frac{a}{2}\sqrt{3}$ if the side is taken. How would the mediaeval architects have determined the summit of the vault by the equilateral triangle if they could not calculate $\sqrt{3}$ other than by geometrical methods? One fantastic way would have been to take a string double the length of the base (i.e., twice 96 braccia), bind it at the ends of the base and span it to get the upper edge of the triangle. A scaffolding would have to be erected first, and the process, although feasible,

28. Similarly elongated are several proportions in the sketches of Villard de Honnecourt; e.g., those of the chapel in the choir of the cathedral of Reims, *vide* Hans Hahnloser, *Villard de Honnecourt*, Vienna, 1935, pls. 60 and 61.

would have been inexact at the scale of the cathedral of Milan. Of course one could have constructed an equilateral triangle to required scale on the ground, then measuring the height. But this would not have obviated the difficulty of constructing that distance in a vertical direction. Thus we become aware that the architect could not postulate the summit of the vault before having built it. He could postulate it in his design and reach it only step by step while building the cathedral. Therefore he marked these single steps by measurements on the piers or walls, as the scaffoldings and the building slowly arose. He had, nevertheless, to calculate these shorter measures in some practical way, and when he used the equilateral triangle, his great unit was incommensurable with the irrational numbers of the heights. Did he construct these shorter steps with strings? Strings change their length according to the degree of tension. The method would have been unreliable and time-consuming. Whatever practical method was used to construct the equilateral triangle it entailed inaccuracy and difficulty. For this reason we must be extremely sceptical of all the exact equilateral triangles indicated in modern literature. At any rate, in Milan in 1391, the architects really wanted to use the equilateral triangle and they therefore wanted to know the exact length of its perpendicular. The problem was to harmonize all other measurements by the introduction of the equilateral triangle. To solve this problem a mathematician was needed and Stornaloco was invited.

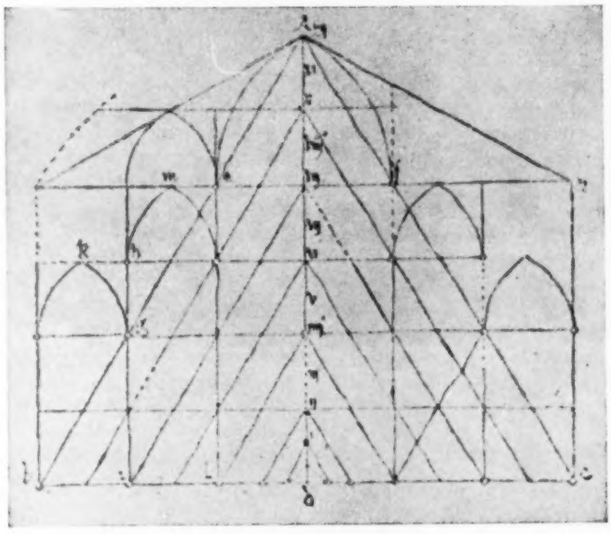

FIG. 3. Stornaloco's Proposition for the Cross-section of the Cathedral of Milan (after Beltrami)

Gabriele Stornaloco was a mathematician living in Piacenza. We know nothing about him beyond this single event in his life. He arrived in Milan on September 24, 1391. After taking measurements for ten days, he received his salary, went home to Piacenza, and shortly afterward sent a letter. This letter has been published several times, most recently by the architect Beltrami, who added an Italian translation.[29] Stornaloco also sent a sketch to which the letter refers (Fig. 3). The Latin text as given by Beltrami is reprinted below with all its orthographical and other mistakes. The English translation was kindly revised and annotated by Dr. Panofsky (footnotes 30–40). To facilitate the comparison of the text and the translation I have separated them into parallel sentences.

Linea AN est lactus exagoni comprensi a circulo comprendente etiam triangulum cujus lactus est latitudo eclexiae scilicet LXXXXVI quantitatum similiter linea AO est lactus quadrati comprensi ab eodem circhulo.

The line AN is the side of the hexagon of [*scil.* within] the circle that also comprises the triangle the side of which is the width of the church, viz., 96 *quantitates*. Similarly the line AO is the side of the square comprised within the same circle.[30]

Bassis trianguli est linea BC et est latitudo eclexie, scilicet LXXXXVI quantitatum.

The base of the triangle is the line BC and this is the width of the church, viz., 96 *quantitates*.

Erit ergo linea AD que est altitudo sumitatis eclexie radix dc dcc mxx $\overset{\text{xxvii}}{\text{sesara}}$ quia tregesime, quod est aliquid minus de LXXXIIII quam divisi in sex partes in figuris triangularibus ac etiam in figuris quadangularibus, prout patet in corpore majori eclexie, et trianguli incipiunt ab unitate secondum naturam triangulorum.

Therefore the line AD, which is the height of the summit of the church, will be the root 600 700 1020 $\overset{27}{\text{sesara}}$ because it is one thirtieth, which is somewhat less than 84; this I have divided into six parts in triangular figures and also in quadrangular figures as can be seen in the major body [*scil.* central nave[31]] of the church, and the triangles begin with one *unitas* according to the nature of [*scil.* equilateral] triangles.

Quoniam unitas com fuerit posita est triangulus in potentia et com adiderimus super ipsam II erit primus triangulus in actu.

For, once the *unitas* has been established, we have a potential triangle, and when we add a second one above it we shall have the first actual triangle.[32]

29. Luca Beltrami, *Per la facciata del duomo di Milano*, Milan, 1887, III, p. 12.

30. The original drawing by Stornaloco obviously included the point O, which is missing in the copy published by Beltrami. However, the location of this point is easily determinable by Stornaloco's text; in our sketch (Fig. 7) the point O and the "square" determined by it, as well as the hexagon determined by point N, have been entered. Thus completed, Stornaloco's drawing corresponds exactly to the cross-section in Cesariano's Vitruvius edition (Fig. 6).

31. As appears from the ensuing discussion, *corpus* always means one of the five naves of the church, either the central nave, or one of the four aisles. *Corpus majus* designates the central nave, *corpus primum* or *corpus minus* one of the outer aisles, *corpus secundum* or *corpus medianum* one of the inner aisles (cf. footnote 34).

32. Stornaloco calls the triangle the side of which is one *unitas* the "triangle *in potentia*" because it contains, potentially, all other triangles which can be developed from it by multiplying the base in terms of *unitates*. The "triangles *in actu*" are those actually delineated in his drawing; viz., the ones with sides of 2, 4, 6, 8, 10, and 12 *unitates*, respectively. The triangle the side of which is two *unitates* is therefore the first "actual" triangle.

Et hoc modo crescunt trianguli in infinitum et in figura suprascripta crescit usque ad duodecimum dividendo lactitudinem in XII partes prout evidenter patet.

And in this manner the triangles grow *in infinitum*; and in the figure above, it [*scil.*, this series of triangles] grows up to 12, by way of dividing the width into 12 parts as is clearly evident.

Qui quidem trianguli omnes sunt equalium lactuum et equalium angulorum, sed quadrati sunt majores in basse quam in lactere altitudinis secundum diferentiam AD et BC.

All these triangles have equal sides as well as equal angles; the quadrangles (quadrati) however, are larger with respect to their base than with respect to their vertical side, according to the difference between AD and BC.

Preterea quia omnis linea perpendicularis demonstrat se esse majorem secundum quantitatem suam quam linea posita in base, ut linea AD que non multum videtur differre ad lineam BC, quamvis sint differentes ut supra.

Further [*scil.*, note] that every vertical line gives the impression of being longer in quantity than a line [*scil.*, of the same length] used as base [*scil.*, placed horizontally]: witness the line AD which does not seem to differ much from the line BC although they do differ as above.

Competens altitudo est secundum distantiam centri ad centrum colonarum, quia in lactitudine majori est XXXII quantit.

The appropriate height is in accordance with the distance from center to center of the piers, inasmuch as it amounts to 32 *quantitates* in the major width [*scil.*, in the width of the central nave].[33]

quidem colone ascendunt usque ad sumitatem quarti quadrati et basem octavi trianguli in angulis E et F, et linea EB secatur per medium in ponto G quod est altitudo minorum colonarum, mediane vero colone ascendunt usque ad anguli H,

The piers, however, rise to the summit of the fourth quadrangle and to the base of the eighth triangle in the corners E and F;[34] and the line EB is cut in half by the point G which marks the height of the minor piers [*scil.*, the wall piers of the outer aisle]; but the intermediate piers [*scil.*, those separating the outer from the inner aisle] rise to the corner H;

et in primis corporis lactitudo, que est BI, ascendit usque ad pontum K, secondi quod est IL ascendit usque ad pontum M, non secundum veram proportionem quia equales sunt in lactitudine ergo deberent esse equales in altitudine, sed propositum minorem cum majorem qui est duplum minoris lactitudinis

and in the first [*scil.*, outer] aisles the width, which is BI, ascends up to the point K; that of the second [*scil.*, inner] one, which is IL, ascends to the point M[35] — not according to the true proportion, because they [*scil.*, both aisles] are equal in width and should therefore be equal in height also, but according to the relation of the minor [*scil.*, outer] aisle to the major [*scil.*, central nave] which has twice the width of the minor [*scil.*, outer aisle].[36]

sequitur ergo quod excedit ipsam proportionaliter in altitudine in ponto A, et mediana lactitudo excedit primam in terziam partem ipsius, sequitur ita quod major debet excedere medianam in duplum ejus quod excessit primam, quoniam in lactitudine est dupla ad ipsam prout patet in figuratione quia altitudo AM duplum est altitudinis MK.

Thus it follows that it [*scil.*, the central nave] exceeds it [*scil.*, the outer aisle] proportionally in point A,[37] and the intermediate height [*scil.*, the height of the inner aisle] exceeds the first one [*scil.*, the height of the outer aisle] by one third of the latter.[38] Thus it follows that the major [*scil.*, central] nave must exceed the intermediate [*scil.*, inner] aisle by twice as much as it [*scil.*, the inner aisle] has exceeded the first [*scil.*, outer] one[39] because it is twice as large in width; it is indeed evident from the drawing that the height AM [*scil.*, the distance between A and the level of M] is twice the height MK.

33. Since the round measurement of 32 *quantitates* appears in the axial distances, and not in the clear interstices, Stornaloco takes it for granted that the former, and not the latter, must be accepted as the basis for the computation of the heights.

34. The reference to the corners E and F (to translate *in angulis* with "at the angles" instead of "in the corners" would be nonsensical in a discussion intended to fix the terminal points of vertical members) proves that Stornaloco, when speaking of the height of the piers, measures them from the base to the springings of the vault ribs, adding the wall shafts to the piers proper. Therefore the "minor piers" mentioned in the following sentence as rising to point G cannot be the piers separating the inner aisles from the outer ones (for these rise, by the same token, to the level of H and K), but must be the wall piers of the outer aisle. This in turn proves that the term *medianus*, applied to the piers that do rise to the level H and K, does not refer, as might be supposed, to the central nave but to the inner aisle; this could be called "intermediate" both on account of its position between the central nave and the outer aisle and on account of its height which is smaller than that of the central nave but surpasses that of the outer aisle. Misled by the numerals denoting the dividing points of the central axis, Stornaloco committed a slight error when he placed the points E and F on the level of the *base* of the eighth ("potential") triangle. In reality the "summit of the fourth quadrangle" coincides with the *summit* of the eighth — or with base of the ninth — triangle.

35. As appears from the reference to points K and M, Stornaloco here means the total height of the aisles. But he visualizes this total height as coming about by the raising of the base lines BI and IL, respectively; silently presupposing the definition of a line as the path of a point, of a plane as the path of a line and a volume as the path of a plane. In free translation his sentence would read: "The height of the outer aisles, whose width is BI, reaches up to K; that of the inner aisle, whose width is IL, up to M."

36. "True" means absolute proportion in the strictly mathematical sense. Given only two rectangles, one having the base a and the height b, the other having the base c and the height d, these two rectangles are proportional if $a:b = c:d$. Therefore, if $a = c$, b equals d. This applies to the inner and outer aisles whose widths are equal; but the presence of another element, viz., the central nave, which has twice the width and twice the height of the outer aisle, makes it necessary to sacrifice the absolute proportion (in this case identity) in favor of a relative one, which relates the inner aisle both to the outer one and to the central nave.

37. The central nave, culminating in A, is indeed "proportional" to the outer aisle in a strictly mathematical sense: it is 32 by 84 while the outer aisle is 16 by 42, the proportion being 8:21 in both cases.

38. *mediana lactitudo* must read *mediana altitudo*. For, no width in the church exceeds another width by one third; whereas the height of the inner aisle (from the base to M, equalling 56 *quantitates*) does exceed the height of the outer aisle (from the base to K, equalling 42 *quantitates*) by exactly one third of the latter, viz., by 14 *quantitates*.

39. In fact the distance between A and the level of M, E and F (equalling 28 *quantitates*) is twice the distance between the level of M etc. and the level of K (equalling 14 *quantitates*).

Omnes lactitudines acepi mensuratione centri ad centrum icdeo non curavi in designamento ponere spissitudinem colonarum quia satis est manifestum Magistris Inzigneriis quantum occupant in corporibus ecclesie nec non lactitudine et area multa quidem possunt describi in numeris omnium corporum designatorum prout se habent secundum figuras geometricales, sed dimito causa prolixitatis.

I have taken all the widths according to the measurement from center to center; therefore I have not bothered to enter into the drawing the thickness of the piers because it is sufficiently clear to the master architects how much they occupy within the bodies [*scil.*, central nave and aisles] of the church; and also with respect to the width and the area of all bodies [*scil.*, central nave and aisles] represented in the drawing much could be set down in numbers as to how they are related according to geometrical figures.[40] But I dismiss this on account of lengthiness.

Et hanc reverentiis vestriis transmitto ordinatam prout melius mihi possibilitas est.

Supplicans quatenus dignemini suportare quod erratum conffusumque fuerit, quia Deo teste si melius scirem cordialiter adimplerem.

And I submit this report to your Worships to the best of my ability,

entreating you that you may deign to bear up with whatever may be mistaken or confused; for, God is my witness, if I knew better, I would act accordingly with all my heart.

This letter is interesting from many points of view. Stornaloco, the mathematician, had the conviction that a nave which has the double width of its side aisle should have also its double height. This could be achieved in a cathedral of five aisles only for the outer aisle and the middle nave. Thus he tried to find a justifiable proportion for the intermediate aisles. In my opinion this passage of Stornaloco's letter is the unique literary confirmation of the so-called "law of similar figures" which was rediscovered by August Thiersch.[41]

In his sketch Stornaloco shows a higher arch over the intermediate aisle at the left side. This arch can be interpreted in different ways; in any case it has never been discussed at length, and I leave it to others to decide if it suggests how this aisle should be in true proportion to the outer one (and thus in wrong proportion to the middle nave); or if it means something totally different.[42]

For present purposes our main concern is to determine how Stornaloco managed the adaptation of the section to the equilateral triangle. First, he gave a calculation of its height, involving the factor $\sqrt{3}$. No one understood this calculation until my friend Erwin Panofsky helped me to translate the words "radix dc dcc mxx $\overset{\text{xxvii}}{\text{sesara}}$ quia trigesime." The reader will find his explanation at the end of this article and may notice that he emphasizes that this interpretation is partly hypothetical. He who disagrees may seek a better and final solution. Second, Stornaloco evened the vertical height of the triangle to the integral number of 84 braccia. The triangles which he drew are therefore equilateral, although those which he indicated with his numbers and recommended for the execution were not equilateral, even if isosceles. Third, he divided the height of 84 braccia into six parts, obtaining heights of 14 braccia. These heights he halved again and got the "great unit" of 7 braccia for the new section. This triangle with the height of 7 braccia he called "triangulus in potentia."

By adjusting the real height of the equilateral triangle to 84 braccia and abandoning the exact regular triangle, Stornaloco obtained a rational measure of the great unit for practical use. The measure of 10 braccia (or of 5 braccia) for the great unit in the draft of the first architect in 1386, and the proposition of 7 braccia for the working unit in Stornaloco's letter, both confirm the discovery of Kossmann, who even in the choice of the term "Grosse Einheit" coincided with the original term. By *quantitas* Stornaloco meant the conventional measure of one braccio and when he means the "great unit" he speaks of *unitas*. Seven braccia equal 4.165 m. A lath of this length may be imagined as having been used to mark the stages of construction in wall and pier, and so on until the designated height was reached. One could of course divide the great unit into seven parts and use it as a yardstick[43] but such a partition was not needed for the main points of the elevation.

Shortly after the receipt of Stornaloco's letter the German architect Heinrich Parler, who had been invited to give his expert opinion, arrived in Milan. He strongly criticized both the first draft and the proposition of Stornaloco and demanded instead to be permitted to erect the building *ad quadratum*. But disliking this steep proportion the Lombards opposed it. The dispute continued for several months. On the first of May 1392 a meeting of fourteen architects and engineers convened, including the hated foreigner Parler. The assembly had to answer eleven questions.[44] One of these was whether the church should be

40. Stornaloco means to say that, in his cross-section, there is a numerically determinable relationship, not only between widths and heights but also between widths and surface areas; so that, for instance, the cross-section area of the central nave would be (considering the pointed arches as straight lines) $32\times56 + 16\times28 = 2240$ square *quantitates*, etc. In sum, the cross-section areas of the central nave, the inner aisle, and the outer aisle are 20:7:5.

41. August Thiersch, *Die Proportionen in der Architektur*, *Handbuch der Architektur*, IV, 1, Leipzig, 1904.

42. See note 54.

43. Or foot rule.

44. This whole story has been related several times. The main source is *Annali della fabbrica del duomo di Milano dall' origine al presente, pubblicati a cura della sua amministratione*, I, Milan, 1877. Older literature is to be found in the article of Fr. W. Unger, "Die deutschen Dombaumeister in Prag und Mailand," *Zeitschrift für bildende Kunst*, VI, 1871, pp. 99 and 125. Later literature: Boito, *loc. cit.*, and Dehio, *Die kirchliche Baukunst . . .*, II, Stuttgart, 1901, p. 534. I am concentrating here on the single problem

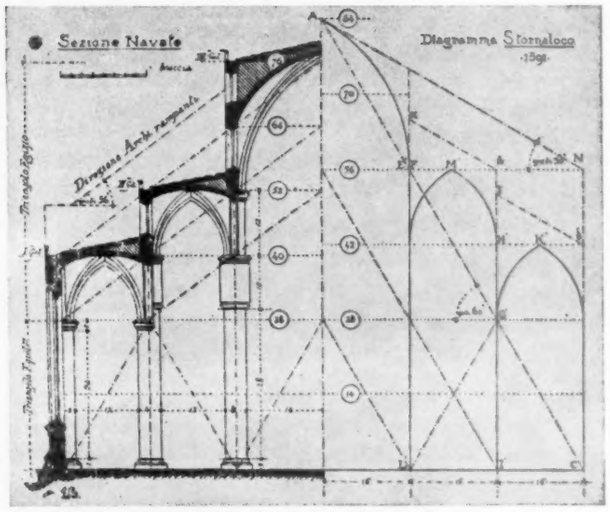

FIG. 4. Stornaloco's Proposition Compared with that of the Meeting of May 1st, 1392 (after Boito)

constructed *ad quadratum* or *ad triangulum*. Parler was voted down by all the others present at the meeting. They decided that the church should ascend "to the triangle or to the three pointed figure and not higher." The original Latin text reads, "usque ad triangulum sive usque ad figuram triangularem et non ultra." The sense of this sentence becomes clear from other parts of the record.

The meeting accepted Stornaloco's written proposal that the height of the impost line in the outer side aisles be 28 braccia, that is 4 x 7 braccia or four great units. But they then fixed the next impost line, that of the inner side aisle, at 12 braccia, instead of 14 braccia, as Stornaloco had done. Another 12 braccia higher is the impost line of the vault in the central nave and this vault itself is twice 12 or 24 braccia high. The summit of the vault now attains 76 braccia (Fig. 4).

Beltrami had noticed that the whole change was performed by substituting the Pythagorean triangle for the equilateral one. The width of the middle nave is, as we know, 32 braccia; its half is therefore 16 braccia and when the new height of 12 was introduced, instead of the 14 assumed by Stornaloco, this change resulted in the proportion of the Pythagorean triangle. This is, as everyone knows, a right-angle triangle the sides of which are 3:4:5. The right-angle triangle determined by catheti of 12 and 16 braccia, introduced for the upper parts of the cathedral at the meeting on the first of May 1392 has the proportion of 3:4 and is therefore a Pythagorean triangle.

Of course the older school of art historians, insofar as they believed in the existence of a secret of the masons, concluded that the Pythagorean triangle must have had a mystic value for the beauty of the cathedral of Milan. This was the more convincing as the name of Pythagoras has since ancient times been surrounded by secret wisdom. But all we have to do in order to understand the value of this figure is to notice that now the great unit has again been changed as far as the elevation is concerned. Parler wanted to use in the elevation the same great unit that had been used for the ground plan, viz., 8 braccia; Stornaloco proposed 7 braccia; the meeting of the first of May preferred one of 6 braccia. Yet all parties chose a rational multiple of the "quantitas" to obtain the "unitas." It is well known that the Pythagorean triangle is very practical, being the simplest way to construct the right angle. It was also recommendable for the higher parts of a big building because at each level one could work with the three measures of 3, 4 and the hypotenuse 5 (the latter probably being a lath) to control the dimensions. The introduction of the Pythagorean triangle again proves the use of the "great unit" of Kossmann.

It may be added that in the actual building all heights are half a braccio lower than we should expect from the foregoing analysis. This is but one foot, and one might first be inclined to overlook it as a probable mistake in measuring. This is, however, impossible if the great unit was used. A lath of 7 braccia would give the height of 28 braccia and not 27½. It follows that this difference was intentional. Its reason can, I believe, be determined.

We saw that at the meeting the height of the wall piers of the outside naves was taken from Stornaloco's sketch as 28 braccia. Stornaloco had calculated that the height of an equilateral triangle with a base of 32 braccia is 27.71... braccia and he rounded off this impractical length to the nearest higher integral, or 28 braccia. The architect of the building who had to make the final decision after the session of the first of May remembered the words "ad triangulum sive ad figuram triangularem et non ultra." What did these words mean? From the context of the record it seems to me — and other investigators may correct me if I am wrong — that it should be translated: "up to the Pythagorean triangle or up to the equilateral triangle and not above." If this is right the words "et non ultra" mean that one should not enlarge the height of 27.71... to 28, as Stornaloco did, but reduce it to 27.5 braccia. This explains the lowering by half a braccio or one foot.

Why that was done can be answered in two tentative ways. First, there were obstinate people who wanted to oppose the high proportions of French and German Gothic as much as possible. Probably the height reached, when Bonaventure left, was already in one or more places 27.5 braccia. The second possibility is that a certain superstitious belief in the esthetic value of the equilateral triangle really existed in the hearts of all thirteen Milanese architects who were present at the famous meeting. They may have argued

of the measurements leaving other problems for my book in preparation.

that the height 27.5 came a little nearer to the real height of the equilateral triangle (27.71...) than did 28 braccia.

The Milanese documents which accompany the ensuing disputes — above all those of the French architect Mignot — are conclusive, but they may be dispensed with in this essay; I shall treat them later in a book on the literary sources of Gothic architecture.

3. The Origin of the *Triangulatura* and the *Quadratura*

It remains to ask how old the method of *triangulatura* may be. Was it introduced for the first time in 1391 when Stornaloco was invited to give his expertise? If it was known earlier, why should a mathematician have been called in? The answer therefore seems to be that *triangulatura* was invented in November 1391. But this conclusion is wrong. Dehio has shown that all masterworks of French Gothic architecture, including the cathedral of Cologne, are constructed with the help of the equilateral triangle. And he gave many other earlier examples proving the use of this proportion. It does not suffice to argue that Dehio's measurements are mostly inexact. They may be inexact, but the differences are not great enough to disprove the equilateral triangles he has shown. We must continue our investigations before this problem can be solved. We must not expect that the methods used in the special case of the cathedral of Milan were valid for all other mediaeval churches or even for a few. But we may find out that the "great unit" was valid in many cases.

We are also interested in the date of the origin of *quadratura*. Here one must discriminate between a "net of squares" as it is used in the ground plan of the cathedral of Milan and also proposed by Heinrich Parler for the cross-section, and on the other hand, the key figure consisting of "two squares," of which the inner one was defined by the half of the diagonal. The net of squares appears in the sketch book of Villard de Honnecourt for the construction of a frontal face.[45] It goes back at least to Vitruvius.[46] The method of two squares of Roriczer and Schmuttermayer was taught in the thirteenth century by the so-called "Magister 2," who added several designs to the sketch book of Villard. Ueberwasser[47] has recognized that this master, who wrote about 1260, had in mind the same trick of measuring as Roriczer expounded in 1486. But this "Magister 2" did not make the purpose and importance of his method clear. In reading the text of "Magister 2," most people will ask why it should be useful to construct the width of a cloister in this way. One can even confirm such skepticism by remembering cloisters which do not obey this proportion. But then one must consider that in fixing the width of the gallery in a cloister not all has been done. One has to determine the measurements of the piers, the arches, the tracery, etc., and they all are dependent on the first measurement. All measurements must be commensurable or reducible to the same key figure. The more complicated the details became in Gothic architecture the more indispensable did this method become. Only against this background can the real meaning of the German word for tracery, *Masswerk*, be understood, or the creation of this term justly appreciated: *Masswerk* means "work of measurement."

The figure of the two squares determining the proportion was introduced by "Magister 2" on the same page with the solution for doubling a square (Fig. 5). The text of Magister 2 says, "Par chu parts om one pirre que les II moitiers sont quareis," or "thus one divides a stone, so that the 2 halves are squares." It was never understood for what reason this task was inserted in the text of Villard's sketch book, as in practice it will never happen that a mason has to divide a stone of the size of a square into two stones of the size of two smaller squares. Obviously "part" does not mean here that the stone really had to be cut, but "divided," in the same sense as we divide a square by drawing the necessary lines on paper. That a stone is mentioned, may be taken as a proof for my suggestion that such divisions were sometimes made directly on the surface of a stone, for instance on the surface of the pedestal of a pinnacle, to find the size of the next body. The partition of a square into two squares was also taught by Vitruvius.[48] His text, the sole remnant of a once abundant antique literature on architecture, was known in the Middle Ages and was copied many times. The oldest preserved manuscript is of Carolingian execution. The other 53 manuscripts were copied through the eleventh and the following centuries until about 1460.

It may be mere chance that Vitruvius, after having shown how to double a square, explained the Pythagorean triangle in the paragraph immediately following. But it is probable that the figures which were so important in Milan had been connected with each other in the architects' minds since the time of Vitruvius. It seems as if they were fascinated by these more than by any other figures; but we may add that besides the square and the Pythagorean triangle, the equilateral triangle shared the same special dignity. These three figures are, so to speak, a geometrical elite. The dispute in Milan may be characterized as a contest among the partisans of the square, the Pythagorean triangle, and the equilateral triangle. Yet one must not conclude that mediaeval architects did not know other figures. On the contrary, in his "portraiture," Villard de Honne-

45. Hans Hahnloser, *Villard de Honnecourt*, Vienna, 1935, pl. 38e.

46. Vitruvius, III, 1, 2.

47. Walther Ueberwasser, "Nach rechtem Masz," *Jahrbuch der preussischen Kunstsammlungen*, LVI, Berlin, 1935, pp. 250 ff.

48. Vitruvius, IX, Introduction, 4.

court taught many other geometrical figures for the use of sculptors and painters. The "portraiture" and the secret of the masons both aim toward the same goal, which is the enlargement of a small sketch to the desired size of the finished work. Great exactness was not necessary in painting or sculpture, and therefore irregular figures as well as regular ones could be used by Villard. In architecture, however, exactness is indispensable, at least in works of Gothic style, and irregular figures are excluded. On the other hand, the need for exactitude does not yet explain the selection of the two kinds of triangles and the two interconnected squares among all other geometrical figures. But this selection can be explained. Before describing the doubling of the square, Vitruvius stated that this solution was found by Plato. It is at the same time incredible and obvious: the special form of the secret of the masons derives from Plato.

In the *Meno*, written between 394 and 390 B.C., Plato introduces Socrates and Meno discussing whether virtue can be taught. Socrates explains that learning is but remembrance of our eternal soul. We already acquired all knowledge in a former life. To prove this dogmatic statement he calls in a slave who never before had learned mathematics, and by putting his questions skillfully, makes the slave solve the task of the doubling of a square.[49] The design Socrates drew in the sand is identical with the two squares of the Magister 2, Roriczer and Schmuttermayer. It is certain that the solution of this simple problem had been found before Socrates' time. Plato's dialogue is fundamental for ethics generally, and particularly for the thesis that virtue can be taught. It was known to every Greek of higher education, and thus to every architect and to those theoreticians of architecture whom we find quoted by Vitruvius. Plato's *Meno* made the doubling of a square one of the most popular theorems of geometry. Today the written remnants of what is probably a continuous chain of tradition between 394 B.C. and 1486 A.D. are only Plato's *Meno*, Vitruvius, the Magister 2, Roriczer and Schmuttermayer.

But that is not all. In the *Timaeus*, Plato speculated about the creation of the world. Mathematicians before this time had found that although an indefinite number of regular polygons may be postulated in the two-dimensional plane, only five regular figures exist in three-dimensional space. These were called the most perfect bodies. Plato[50] invested them with cosmological significance: he attributed the dodecahedron to the universe as a whole (or to heaven), and the others to the four elements, the cube to the earth, the icosahedron to water, the octahedron to air, the pyramid (tetrahedron) to fire. Plato did not enter into an analysis of the pentagon, which is the surface element of the dodecahedron; he was interested only in the four other primary bodies. One would expect him to compose the cube from squares and the three other bodies from equilateral triangles. But surprisingly, he divided the square into four isosceles rectangular triangles by drawing two diagonals (55B). Thus the cube is not directly composed by six squares but indirectly by six times four triangles. With regard to the other three bodies he first stated that the "best" triangle is the half equilateral one (54A). From this half one can compose an equilateral triangle either by putting two together, by joining the longer pair of their catheti, or by putting two triangles together at the hypotenuse, and then combining three four-sided figures of this kind. Thus this second construction needs six elementary triangles. The reason why Plato calls the half of an equilateral triangle the "best," is not absolutely clear. Cornford has tried to explain it.[51] The reader may study this very clever explanation in Cornford's book. It may be objected that Cornford's series of triangles begins with two triangles, while that of Plato begins with six; and that, on the other hand, the series Cornford construes for the squares begins with two elements while that of Plato begins with four. This alters the argument more sensibly than may be guessed at the first glance. Plato seems to say (51C–D) that he wants to have at the disposal of God squares and triangles of different size to create the different substances not only of earth, of water, of air and of fire in the specific sense we use these words today; there rather exist different kinds of earth (minerals), of water (fluids), etc. The longer I studied Plato's text and Cornford's commentary, the more it seemed to me that Cornford is right and that Plato meant his elements are the "best" figures, because they are the simplest ones for the creation of the four primary bodies in different size, those perfect bodies of which God created all kinds of substances. Plato sanctified the equilateral triangle and the square. For him, as everybody knows, goodness and beauty were in their deepest essence identical. The mediaeval esthetic, insofar as it was based on Plato, took over this identification. It does not matter for our purposes that some great scholastics did not agree with Plato entirely, because we may assume that the architects already possessed their strong, unshakable tradition.[52] Thus when a Gothic architect wanted to build a cathedral, the house

49. The Loeb Classical Library, *Plato*, IV, *Menon*, p. 305; Greek text with English translation.

50. Plato, *Timaeus*, 55 D–56 C.

51. Francis Macdonald Cornford, *Plato's Cosmology, The Timaeus of Plato Translated with a Running Commentary*, London, 1937, pp. 230 ff.

52. Raymond Klibansky, *The Continuity of the Platonic Tradition during the Middle Ages*, London, 1939. This book does not fix the dates of the manuscripts still preserved, but Klibansky says on page 28 that the Latin translation of the *Timaeus* "and its commentator" have been the basis for harmonizing the Mosaic and the Platonic narratives. "These tendencies culminated in the twelfth century in the School of Chartres which exercised a profound in-

of God, the home of the *summum bonum* which is identical with absolute beauty, he wanted to create the most perfect building. Using the two elementary triangles of the *Timaeus*, he based his design upon ultimate elements which guaranteed beauty and perfection. For a mediaeval architect such mystic aesthetics had a quieting and reassuring effect. We have in the course of this whole consideration to distinguish sharply between the highly educated architect and the less educated mason who learned no more than was needed for his practice. The mediaeval mason used whichever key figure he was taught, because he had no yardstick, but the mediaeval architects chose the special form of the key figures because they were influenced — directly or indirectly — by Plato's *Meno* and *Timaeus* to believe that these key figures were the holy elements of which God himself had created the universe. Thus their choice includes the superstition that certain figures, being the "best," and (with Plato) at the same time the most "beautiful," guarantee beauty in architecture.

Having distinguished clearly between the motives of the architect and the mason, we have to acknowledge that both worked together and that, therefore, the architect had to respect the task of the mason, adjusting his holy figures to the conditions given by the simple mind of the mason. The story of the cathedral of Milan is an excellent illustration for this interconnection, culminating in the cross-section of the cathedral as it was delineated by Cesariano in his commentary on Vitruvius (Fig. 6).

Cesare di Lorenzo Cesariano (1483–1543), born in the same year as Raphael, was alive during the height of the Renaissance. He was a pupil of Bramante in Milan before 1498. He left his birthplace because his stepmother tried to poison him.[53] Working in different Italian cities he became a humanist and archaeologist concentrating in the study of Vitruvius. He not only edited the text but also commented on it abundantly. And so we are supposed to expect that at heart he was an admirer of antique architecture and its modern version in the works of Brunellesco, Alberti and Bramante. But in order to illustrate what Vitruvius had to say about proportions, Cesariano drew the cross-section of the cathedral of Milan, a late Gothic building. How shall we explain this?

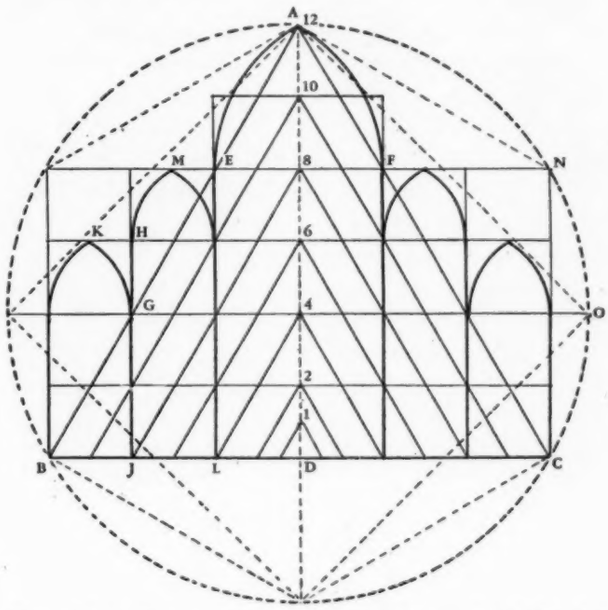

FIG. 7. Cross-section of the Cathedral of Milan: Sketch for the Elucidation of Stornaloco's Drawing

The obvious answer is that Cesariano was living again in Milan at the time when he wrote his commentary. Hence it is very alluring to blame the *genius loci* of Milan, which Cesariano could not evade. He gives the cathedral of his town as the model of best proportions. But his famous woodcut does not show the real proportions of this building. Nor does it show the numerical adjustment of the equilateral triangle to the necessities of execution by masons who had no yardstick. On the contrary, it elongates the proportions so that we have the ideal proportion of the exact equilateral triangle. He also includes in this system of triangles the *Tiburio* which is not delineated in Stornaloco's sketch. His illustration looks more complicated than that of Stornaloco. He not only drew the full containing circle, which was indicated by a small arc in Stornaloco's sketch, but he also inscribed the square, and added two larger circles and still other lines which are rather more confusing than clarifying. The whole is an excellent example of those networks which give the impression that beauty is an exercise of intelligence. Cesariano's woodcut is probably the spiritual father of all modern complicated nets of magic proportions. But it is easy to reduce this whole design to get the cross-section of Stornaloco's sketch, by

fluence on teachers of the arts in Paris in the following century. The *Timaeus* was read in this faculty with explanations from William of Conches' commentary until, in 1255 at latest, it was superseded in the official order of studies by the Aristotelian corpus, though it is to be found occasionally in University manuscripts of later date." The teachers of the arts are of course those of the *artes liberales*, including geometry. It is very probable that in the lessons on geometry the pupils learned the doubling of the square and became also acquainted with the equilateral triangle and its importance for the creation of the world following Plato's *Timaeus*. It is at least imaginable that the same is true for other schools of the thirteenth century and we are allowed to assume that by this way Villard de Honnecourt and the "Magister 2" as pupils came in touch with the figures which became later the main tools of their architectural practice.

It is not clear to me whom Klibansky means, referring to the "commentator" on the *Timaeus*. At any rate, the well known Commentary of Chalcidius would not have been a source for the square and the triangle because the Latin translation by Chalcidius (who lived probably in the fourth century A.D.) stops exactly before the paragraph which discusses these figures and the commentary itself does not touch this question.

53. Thieme-Becker, *op. cit.*, VI, Leipzig, 1912, p. 312.

taking out the cross-section of the nave with its double aisles. Beltrami believed that Cesariano had some older drawing at hand. We can be absolutely convinced that he had the original letter by Stornaloco at his desk.[54] As architect of the Duke Massimiliano Sforza since 1512, returning to Milan in 1513, and painting a picture (or mural) for the Sala dei Deputati this same year, he certainly had access to the archives of the cathedral when he began to write his commentary after 1515. Undoubtedly the quarrels about the proportions were not yet forgotten and Cesariano was aware that the real proportions were not those of the equilateral triangle. Nevertheless he showed the cathedral in an ideal design and not as it was executed. One may call this a falsification, but it may more rightly be interpreted as the expression of his conviction that the cathedral should have been built up as he showed it.

Now we are ready for conclusions. Cesariano, Bramante's pupil, was faithful to Gothic tradition; but through Stornaloco's letter he was paradoxically connected with Vitruvius and Plato. Modern scholars are used to take the equilateral triangle as an heritage of mediaeval architectural practice. Now we see that it was an antique heritage preserved through the Middle Ages. Therefore Cesariano, in emphasizing the equilateral triangle, preached antique wisdom as a model for coming generations. Did he believe he was teaching a Gothic rule of proportions? Or did he know that the secret of the masons had a secret root in antique practice? Whatever he really knew, he taught an antique heritage in the disguise of Gothic tradition, as an architect of the High Renaissance.

The second conclusive statement is that the methods *ad quadratum et ad triangulum*, as applied in practice, were for the masons themselves a mere measure of expediency and not means for creating beauty. But the recurrence of the same proportions automatically creates an organic unit, whatever the proportion may be. This is the real relation between beauty and the secret of the masons. The "law of similar proportions," discovered by August Thiersch, is therefore led back to its origins, from the necessity of translating a sketch into working size without use of a yardstick.

The last conclusion refers to the specific selection of the square and the equilateral triangle. This choice was made in respect to their importance in Plato's mythological and geometrical cosmology. It is based on superstition: the identification of goodness and beauty is basically erroneous, as well as the identification of regularity with highest beauty. Plato was probably dependent upon Pythagoras. The Pythagorean triangle, composed of rational numbers, received the same rank and dignity as the square and the equilateral triangle, through the traditional worship of Pythagoras.

Cesariano believed in the mediaeval and antique mystery of the equilateral triangle. Throughout the centuries, before and after Plato, mankind has produced the same type of believers in mysteries who are at once romantics and rationalists. And this is the innermost secret of the secret of the masons.

PRINCETON, NEW JERSEY
JULY 2, 1944

54. It seems to me that this is also proved by the indication of a pointed arch over the outer side aisle, similar to that which Stornaloco drew over the inner aisle. I referred to this arch above and I believe that in Cesariano's woodcut this arch can only mean the arches of the transept, those between its nave and the side aisles. Consequently they mean in Stornaloco's sketch the wall arches of the nave in the transept. Cesariano preferred to change this indication of the transept elevation as shown in Stornaloco's design because he probably did not want to disturb the aspect of the outside architecture too much.

Incidentally, it may be added that this outside decoration was executed only in the nineteenth century. We do not know whether Cesariano took this scheme from older drawings or whether he presented his own invention. In any case his woodcut remains in a high degree responsible for the outside appearance of the cathedral as it exists today.

AN EXPLANATION OF STORNALOCO'S FORMULA

ERWIN PANOFSKY

Dear Frankl,

It is with considerable trepidation that I answer your inquiry about the arithmetical formula in Stornaloco's memorandum. In the first place, the text is transmitted only by copies, one contemporary but partly obscured by a big ink spot (which may or may not affect the passage in question), the other taken in the eighteenth century; and even these copies are at present inaccessible. We have thus to rely on Beltrami's transcription, hoping to God that neither he nor the two copyists have committed major errors. In the second place, the text, such as it is, lacks any symbols that would indicate the operations to be performed with the numbers given. While this absence of symbols is not surprising in view of the fact that the now familiar system of algebraic notation did not attain its present uniformity until comparatively recently, it is hazardous to interpret a mediaeval formula transmitted without an explanation in words; vulgar fractions, for instance, were variously written $\frac{a}{b}$, $\frac{a}{b}$, $a\,\bar{b}$, or even, with the stroke distinguishing the denominator from the numerator omitted by the writer or overlooked by the copyist, simply $a\,b$.[1] In the third place, the expression $\overset{\text{XXVII}}{\text{sešara}}$ *quia tregesime* — apparently a transitional clause rather than an integral part of the formula — is, on the face of it, entirely obscure. In sum, any attempt to decode Stornaloco's message is bound to be, to say the least, conjectural, and it is with this reservation that I submit the following hypothesis.

As we all remember from High School, the height of an equilateral triangle is incommensurable with the latter's side; for, calling the height h and the side a: $h = \sqrt{a^2 - \left(\frac{a}{2}\right)^2}$ (according to Pythagoras) $= \sqrt{a^2 - \frac{a^2}{4}} = \sqrt{\frac{3\,a^2}{4}} = \frac{a}{2}\sqrt{3}$. Since $\sqrt{3}$ is an irrational number, the height of an equilateral triangle is an irrational magnitude (unless its side is either $\sqrt{3}$, or a multiple or fraction thereof). Stornaloco is concerned with the equilateral triangle determining the overall cross-section of Milan Cathedral, a triangle the side of which is given as measuring 96 smaller units (*quantitates*, each *quantitas* amounting to one cubit or two feet) or 12 larger units (*unitates*, each *unitas* comprising 8 *quantitates*). His problem is to rationalize the height of this maximum triangle, hereafter to be referred to as h_m, in such a way that it could be expressed, not only in a whole number of *quantitates* but in a whole number of *quantitates* divisible by 6. For, since Milan Cathedral has five naves all of which were supposed to conform to equilateral triangles — the width of the central nave amounting to 32 *quantitates* or 4 *unitates*, that of the lateral aisles to 16 *quantitates* or 2 *unitates* each — he needed, not only a rationalized value for h_m but also rationalized values for $\frac{5\,h_m}{6}$, $\frac{2\,h_m}{3}$, $\frac{h_m}{2}$, $\frac{h_m}{3}$ and $\frac{h_m}{6}$, viz., rationalized values expressing the heights of triangles, the sides of which are 80, 64, 48, 32 and 16 *quantitates*, respectively. It is for this reason that he rounds out the correct value of h_m — 83.138 . . . — not to 83, which would have been the nearest approximation expressible in whole *quantitates*, but to 84, thereby determining the heights of the five smaller triangles as 70, 56, 42, 28 and 14, respectively.

By his own testimony Stornaloco calculated h_m with the aid of a formula which reads as follows:

"Erit ergo linea *AD* quae est altitudo summitatis eclexie radix dc dcc mxx $\overset{\text{XXVII}}{\text{sešara}}$ quia tregesime, quod est aliquid minus de LXXXIIII . . . ."

"Therefore the line *AD*, which is the maximum height of the church, will be the root 600 700 1020 $\overset{27}{\text{sešara}}$ because it is one thirtieth; which is somewhat less than 84 . . . ."

How did he arrive at this result by means of the numbers given? To judge from the word "radix," he was fully aware of the fact that the correct value of h_m is a multiple of an irreducible square root. His formula must therefore represent, in some way or other, the process of extraction of roots. But the difficulty is that none of his numbers appears to have any relationship with those appearing in a modern solution of his problem. If we should have to calculate the approximate value of the height in an equilateral triangle we should either

[1] M. Cantor, *Vorlesungen über Geschichte der Mathematik*, II, Leipzig, 1892, p. 60; J. Tropfke, *Geschichte der Elementarmathematik*, I, 3rd ed., Berlin and Leipzig, 1930, pp. 162 ff.

naively proceed according to Pythagoras and obtain, for h_m: $h_m = \sqrt{96^2 - 48^2} = \sqrt{9216 - 2204} = \sqrt{6912} = 83.138\ldots$. Or we should employ the formula $h = \frac{a}{2}\sqrt{3}$ and obtain: $h_m = 48 \cdot 1.7320508\ldots = 83.138\ldots$. But it is impossible to connect the numbers 48, 96, 9216, 2204, 6912 and 1.7320508 . . . with Stornaloco's 600, 700, 1020 and 27; and the same applies to the modern calculation of the other heights involved, viz., the heights of the triangles having sides of 80, 64, 48, 32 and 16 *quantitates* respectively.

Beltrami has attempted to explain Stornaloco's numbers, but he frankly admits that "the principle of the calculation does not emerge very clearly." It is quite true that 700 is approximately the square of 27 (the real figure being 729) and that 1020 is approximately the square of 32, that is to say, of one third of the total width (the real figure being 1024); but both these observations have nothing to do with the case. Nor does it help us very much to learn that $\sqrt{\frac{700 \cdot 1020}{100}}$ (Beltrami erroneously writes $\sqrt{\frac{700 \cdot 1020}{10}}$) is approximately 84; for $\sqrt{\frac{700 \cdot 1020}{100}} = \sqrt{7140}$ is considerably *larger* than 84 (84^2 being 7056), whereas Stornaloco explicitly states that h_m is "somewhat *less* than 84." If the numerals following the word "radix" were intended to express the second power of h_m (which second power, we remember, is 6912) 7000 pure and simple would be better than 7140; but even $\sqrt{7000}$ is larger, and not smaller, than 84.[2]

There is, however, no reason to assume that those numerals were meant to express the second power of h_m. What the formula has to accomplish is just to circumvent the process of extraction of roots and to replace it by a simple process of multiplication and division. In other words, the word "radix" would seem to usher in, not the equivalent of a square from which a root has still to be extracted, but the approximate equivalent of the root itself.

Proceeding on this assumption, and taking advantage of the fact that the absence of symbols entitles us to multiply and divide the numerals following "radix" at will, I have tried all possible combinations of 600, 700 and 1020 and finally obtained an equation that seems to make sense:

$$\frac{600 \cdot 700}{1020} = 411\tfrac{3}{17}$$

or, written in decimal fractions, 411.76 . . . . This is fairly close to 415.69 . . ., that is to say, to ten times the height of an equilateral triangle having the side of 48, or to ten times half the height of an equilateral triangle having the side of 96; in other words to $\frac{10\,h_m}{2}$. Then h_m itself would be 82.352 . . . as against the correct 83.138 . . . . But we can go one step further. Since the text is written in Roman numerals, 1020 appears as mxx, followed by the enigmatical $\overset{\text{XXVII}}{se\tilde{s}ara}$. Now, if it were possible — and I shall try to show that it is — to connect the second x of mxx with this $\overset{\text{XXVII}}{se\tilde{s}ara}$ instead of with the two preceding characters, we should be entitled to correct the copyist's mxx $\overset{\text{XXVII}}{se\tilde{s}ara}$ into mx x $\overset{\text{XXVII}}{se\tilde{s}ara}$ (a correction that entails nothing but a difference in spacing) and would obtain the following equation: $\frac{600 \cdot 700}{1010} = 415\frac{85}{101}$ or, written in decimal fractions, 415.84 . . .; and this is as close to the correct value of $\frac{10\,h_m}{2}$, viz., 415.69 . . . , as can be expected from any mediaeval calculation. According to this revised equation, h_m itself would be 83.168 . . . as against 83.138 . . . , an error of less than 0.04%, viz., of less than two centimeters.

The justification for separating the second x of mxx from mx and for connecting it with $\overset{\text{XXVII}}{sesara}$ lies in the fact that only thus the word "se$\tilde{s}$ara" seems to make sense. Its most likely expansion seems to be *sesquialtera*, meaning "once and a half." Then $\overset{\text{XXVII}}{sesara}$ would be $1\frac{1}{2} \cdot 27 = 40.5$, and x $\overset{\text{XXVII}}{se\tilde{s}ara}$ would be 405, a number fairly close to 415.84 . . . as obtained before. True, 405 is a very rough approximation to 415.84 . . . (or to the more correct 415.69 . . .), but this can be accounted for by what follows: "quia tregesime," "because it is one thirtieth." This phrase can refer only to 27; and 27 is indeed, reduced to its integer element, "one thirtieth" of 10 h_m:

$$\frac{10\,h_m}{30} = \frac{831.138\ldots}{30} = 27.71\ldots.$$

And the most important point is that Stornaloco speaks of this value as "one thirtieth," and not of "one third," thereby confirming my silent assumption that his formula determines the required value, not in terms of h_m but in terms of 10 h_m.

In modern writing, then, the content of Stornaloco's calculation might be expressed as follows:

$\frac{10\,h_m}{2} \approx \frac{600 \cdot 700}{1010} = 415.84\ldots \approx 10\,(1\frac{1}{2} \cdot 27)$; for $\frac{h_m}{30} \approx 27$.

Therefore $\frac{h_m}{2} \approx \frac{600 \cdot 700}{10 \cdot 1010} = 41.584\ldots$; $h_m \approx 83.168\ldots$, viz., "somewhat less than 84."[3]

The formula $\frac{600 \cdot 700}{1010}$ as an expression for ten times the height of a triangle having the side of 48 looks very strange to modern eyes. But when we consider the specific nature of the

[2] Apart from this, the number 600 and the phrase "because it is one thirtieth" remain unaccounted for by all of Beltrami's suggestions.

[3] This transcription agrees with the palaeographical treatment of the numerals: XXVII and LXXXIV are written in capitals because they refer directly to *quantitates*. The other numbers are written in minuscules because they are, so to speak, numbers in the abstract.

TO BE INSERTED IN THE MARCH, 1945,
ISSUE OF THE ART BULLETIN

CORRIGENDA

for "An Explanation of Stornaloco's Formula" by Erwin Panofsky

p. 62a, lines 2 and 5: read "2304" for "2204."
p. 63b, line 6: read "*unitates*" for "*quantitates*."

problem and of the tools with which it could be solved, we see that there is method in this madness. The problem was to reduce an irrational value, containing the factor $\sqrt{3}$, to a reasonably accurate expression by means of a formula that had to fulfill three conditions. First, it had to achieve its purpose by means of simple multiplication and division instead of by means of extraction of roots. Second, it had to be applicable without involving an extensive use of vulgar fractions of which the Middle Ages, not yet familiar with the decimal system, were understandably afraid. Third, it had to meet the requirements of architects who measured the sides of their triangles in large units ("unitates") and wished to have the results, viz., the approximate values of the heights of these triangles, in small units ("quantitates"), one *unitas*, we remember, comprising 8 *quantitates*.

Looking at Stornaloco's formula from this point of view, we discover that it is very practical indeed. It operates like a slot machine: we throw in *unitates*, pull the lever, and receive a reasonably accurate result in *quantitates*. For all we have to do is to multiply the given number of *unitates* (expressing the side of the triangle) by 100, multiply by 700, divide the result by 1010 — and we obtain a number which, when divided by 10, expresses with reasonable accuracy the height of the triangle in *quantitates*. Calling the number of *unitates* n, we can rewrite the formula in general terms:

$$10\,h \approx \frac{n \cdot 100 \cdot 700}{1010}.$$

If n is 6, that is to say if the side of the triangle is 6 *unitates* or 48 *quantitates*, $10\,h$ is, as we have already seen, $415\frac{85}{101}$, and it is at once evident that h itself is a little more than $41\frac{1}{2}$ or, as Stornaloco would say, a little less than 42. If n is 12, that is to say if the side of the triangle is 12 *unitates* or 96 *quantitates*, $10\,h \approx \frac{12 \cdot 100 \cdot 700}{1010} = 831\frac{69}{101}$, and it is equally evident that, in this case, h itself is a little more than 83 or, to speak with Stornaloco, a little less than 84. If n is 4, the result for $10\,h$ is $277\frac{27}{101}$, and for h itself a little more than $27\frac{1}{2}$ or a little less than 28; and so forth. We now perceive the advantage of writing out the formula for $10\,h$ instead of for h. For in doing so, we automatically obtain what would be called today the first decimal point of the final value, the .5 after 41, the .1 after 83, the .7 after 27, etc.; so that the fractional rest can be neglected for all practical purposes. We also perceive the advantage of keeping the factor 700 separated from the factor 600. For 700 is constant whereas 600 is variable according to n; and since 100 is divisible by 2 and 4 no fractions can occur even if the number of *unitates* should be $n + \frac{1}{2}$, $n + \frac{1}{4}$ or $n + \frac{3}{4}$ (and $\frac{1}{4}$ *unitas*, equivalent of 2 cubits or 4 feet, is about the smallest measurement to be reckoned with in establishing the cross section of a whole building). Supposing, for instance, that the side of the triangle is $4\frac{1}{2}$ *unitates*, we can simply write: $10\,h \approx \frac{450 \cdot 700}{1010}$, and easily determine that h would be a little more than 31 *quantitates*. Supposing that the side is, let us say, $5\frac{1}{4}$ *quantitates*, we can write: $10\,h \approx \frac{525 \cdot 700}{1010}$, and easily determine that h would be a little over $36\frac{1}{3}$, etc.

In sum, Stornaloco's strange-looking formula is a most handy adaptation of $h = \frac{a}{2}\sqrt{3}$ to the requirements of architects who did not know how to calculate roots by regular "evolution," disliked vulgar fractions, and measured the sides of their triangles by *unitates* while expecting the heights of these triangles to be expressed in *quantitates*. Why he wrote out his equation for $n = 6$ instead of for $n = 12$, thereby obtaining $\frac{h_m}{2}$ instead of h_m itself, and left it to the phrase "$\overset{\text{XXVII}}{\text{sesara}}$ quia tregesime" to lead up to the final result, is difficult to say. My guess would be that the formula as such was not invented by Stornaloco himself but had already been evolved by earlier mathematicians and architects, and that it had been standardized to $n = 6$, that is to say, to an overall width of 48 *quantitates*. For such a width, amounting to from 28 to 31 meters depending on the local cubit or foot, was far more customary for even major ecclesiastical structures than were the 96 *quantitates* (*ca.* 57 meters) determining the width of the abnormally wide, quinquepartite Cathedral of Milan; the Abbey Churches of St.-Remi and St.-Denis, the Cathedrals of Sens, Reims, Amiens, etc., come readily to mind.

There remains the question how this miraculous "slot machine formula" had come into being. It had to be developed, of course, from the general formula $h = \frac{a}{2}\sqrt{3}$. But since a was expressed in *unitates*, and since these *unitates* had to be converted into *quantitates*, a had to be replaced by $8\,n$. Thus: $h = \frac{8\,n}{2}\sqrt{3} = 4\,n\sqrt{3}$. The problem, then, was to insert a reasonably accurate approximation to $\sqrt{3}$ while making the multiplication by $4\,n$ as simple as possible. And the way this was done follows quite logically from the mediaeval attitude toward the irrational in general and toward irrational square roots in particular. The Greeks, one might say, conceived of the irrational as a problem; but the Middle Ages, characteristically designating irrational numbers as "numeri surdi,"[4] conceived of it as a nuisance. When

[4] Tropfke, *op. cit.*, II, 2nd ed., Berlin and Leipzig, 1921, pp. 65 ff. The expression (surviving in our "surds") seems to have been coined by Leonardo Pisano (*ca.* 1200).

Archimedes was confronted with the problem of determining the approximate value of $\sqrt{3}$ he established a lower and an upper limit, both of them very accurate, viz., $\frac{265}{153} = 1.732028\ldots$ and $\frac{1351}{780} = 1.732051\ldots$, respectively. Knowing that this narrow margin could be further narrowed *ad infinitum* without ever vanishing to zero, he had solved the problem both in practice and in theory.[5] The Middle Ages were satisfied with one workable approximation, either a little too great or a little too small. To calculate such workable approximations, two methods seem to have been in use.[6] According to one formula, given by Leonardo Pisano (*ca.* 1200) and popularized by Paolo dell' Abaco (fourteenth century), $\sqrt{N} \approx n + \frac{N - n^2}{2n}$, or, more simply written $\sqrt{N} \approx \frac{N + n^2}{2n}$, where N stands for the given number, and n for the integer element of its root, that is to say for the largest integer the square of which is smaller than N. For instance: $\sqrt{35} \approx \frac{35 + 5^2}{2 \cdot 5} = \frac{35 + 25}{10} = 6$. Evidently this approximation (always somewhat *larger* than the correct value) is the more inaccurate the smaller N; $\sqrt{3}$ would be $\approx \frac{3 + 1^2}{2 \cdot 1} = 2$. In order to achieve a higher degree of accuracy, small numbers have to be multiplied by 100 or a multiple thereof, after which the result must be divided accordingly:

$\sqrt{300} = 10\sqrt{3} \approx \frac{300 + 17^2}{2 \cdot 17} = \frac{300 + 289}{34}$, therefore $\sqrt{3} \approx \frac{589}{340}$. Given a small N, everybody would thus prefer the other method, already known to the Arabs, a method so surprisingly anticipating the idea of decimal fractions that one cannot help wondering how long it took the world to discover the decimal fractions themselves. According to this method, always resulting in a value somewhat *smaller* than the correct one, we simply append to N an even number of zeros (that is to say, we multiply by 100 or a multiple thereof), determine the largest integer the square of which is smaller than the number thus obtained, divide this largest integer by 10 or a multiple thereof, and neglect the rest. Every pair of zeros appended to N thus gives us one more decimal point of the desired root, only that the result is not written as a decimal fraction but as a vulgar fraction the denominator of which is a multiple of 10:

$\sqrt{300} = 10\sqrt{3} \approx 17;\ \sqrt{3} \approx \frac{17}{10}$.

$\sqrt{30000} = 100\sqrt{3} \approx 173;\ \sqrt{3} \approx \frac{173}{100}$.

$\sqrt{3000000} = 1000\sqrt{3} \approx 1732;\ \sqrt{3} \approx \frac{1732}{1000}$ etc.

Assuming that the inventor of our formula employed this method to determine the approximate value of $\sqrt{3}$, and that he was satisfied with the second approximation (which is close enough for all practical purposes), he would have obtained the following equation:

$$100\,h = 4\,n \cdot 100\sqrt{3} \approx 4\,n \cdot 173 = n \cdot 692.$$

Since 692 would be difficult to handle in future operations, he decided to replace it by the round number 700, substituting 175 for 173. But in order to make up for this increase he multiplied by $\frac{100}{101}$, thereby, in addition, somewhat improving the accuracy of the approximation.[7] Thus: $100\,h \approx \frac{n \cdot 100 \cdot 700}{101}$. And since his ultimate aim was to write out the formula for 10 h and not for 100 h, he had to divide the whole equation by ten:

$$10\,h \approx \frac{n \cdot 100 \cdot 700}{1010}.$$

He might, of course, have shortened 700 and 1010 to 70 and 101, respectively. But the Middle Ages, while afraid of vulgar fractions, did not resent superfluous zeros.

Most cordially yours,

ERWIN PANOFSKY.

Kennebunkport, Maine,
August 19, 1944.

[5] C. Müller, "Wie fand Archimedes die von ihm gegebenen Näherungswerte von $\sqrt{3}$?" *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, ser. B (*Studien*), 1933, pp. 281 ff.

[6] Cantor, *op. cit.*, II, pp. 28 ff., 151, and I, Leipzig, 1880, p. 685. Tropfke, *op. cit.*, I, p. 173 and II pp. 135 ff.

[7] $\frac{175}{101} = 1.73267\ldots$ (as against the $1.73\ldots$, as previously obtained, on the one hand, and against the correct $1.7320508\ldots$, on the other). With 175 as numerator, 101 is the best possible denominator; $\frac{175}{101}$ is better than either $\frac{1759}{1008}$ or $\frac{1769}{1021}$.

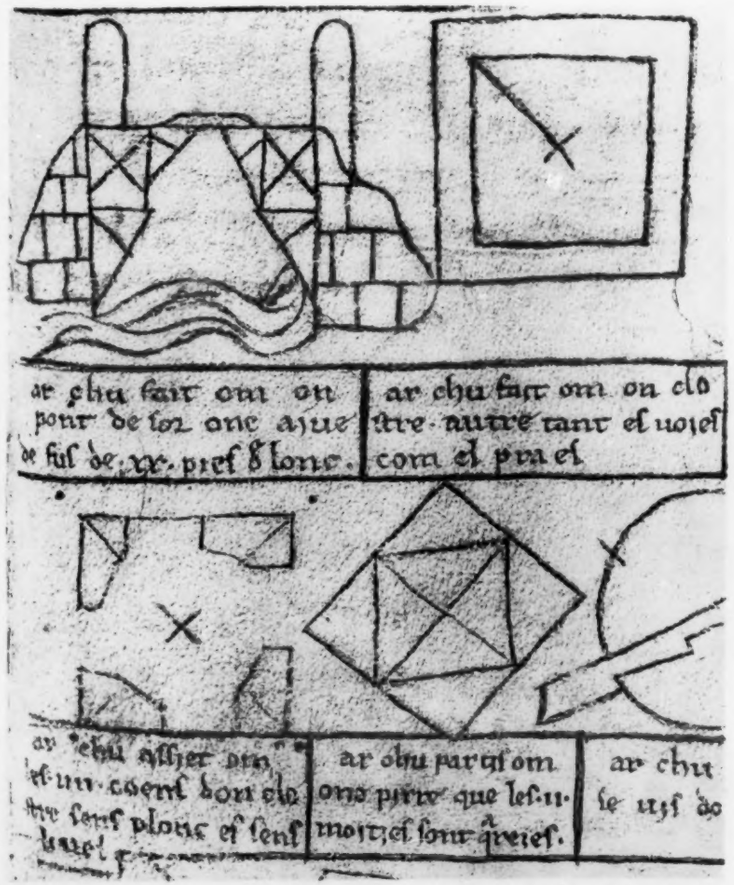
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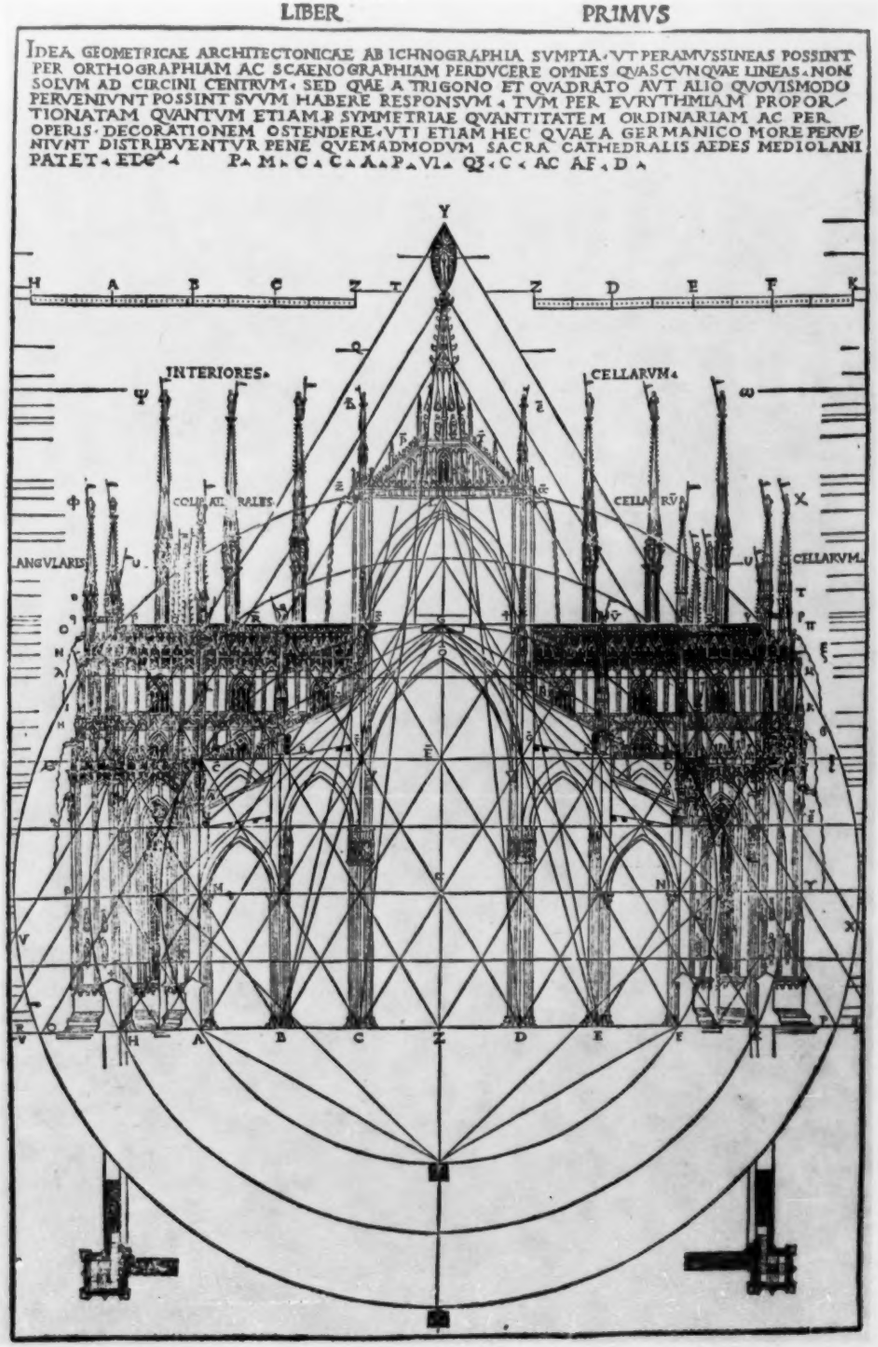
FIG. 5. Sketches from the Magister 2 in the Sketch Book of Villard de Honnecourt (after Hahnloser's Edition)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CELLARVM

FIG. 6. Cesariano's Reconstruction of the Cross-section of the Cathedral of Milan

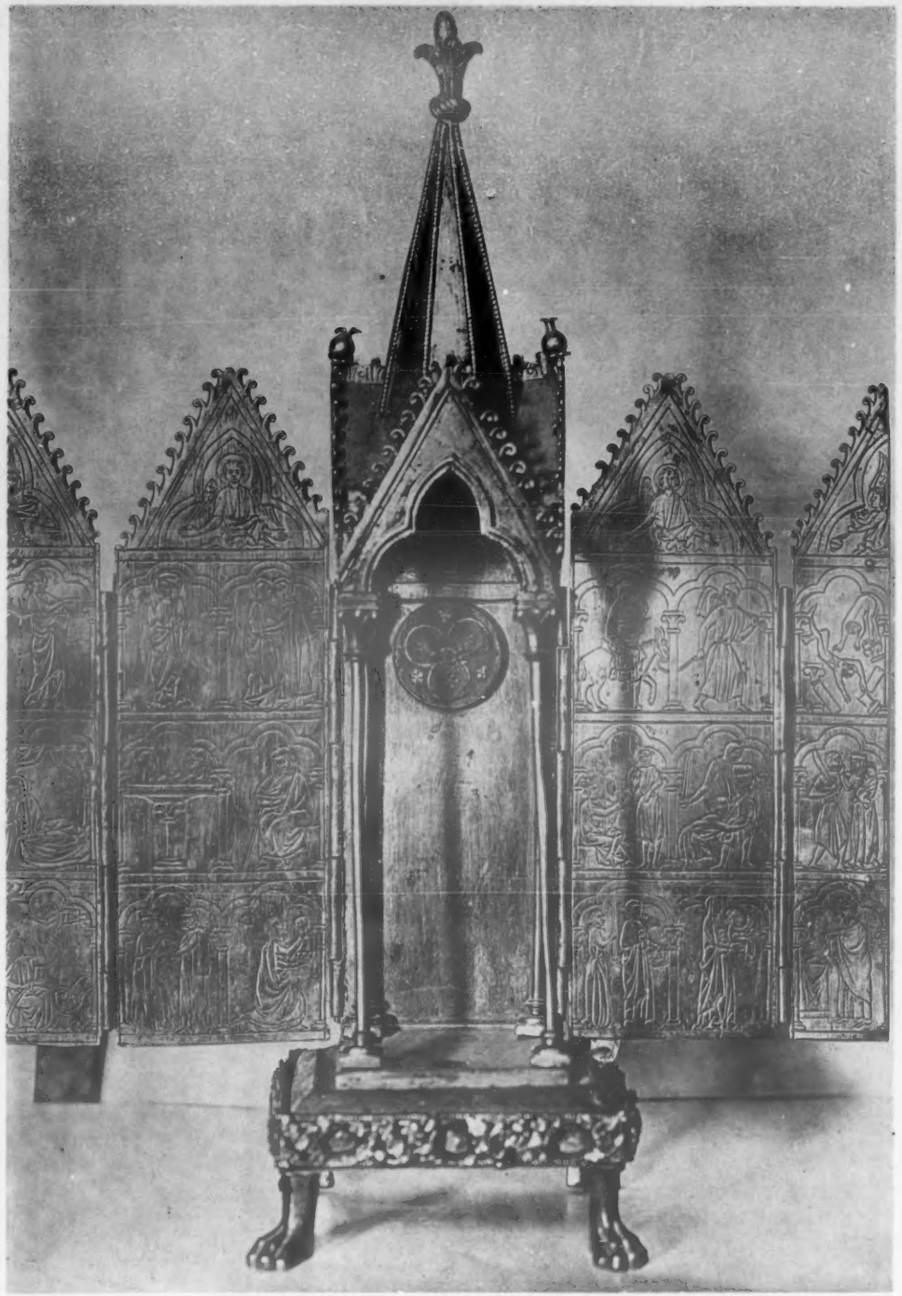


FIG. 1. Rome, Vatican Library, Museo Sacro: Copper-gilt Shrine (Phot., Bibl. Vaticana)

FIG. 2. Rome, Vatican Library, Museo Sacro: Base of the Copper-gilt Shrine (Phot., Bibl. Vaticana)

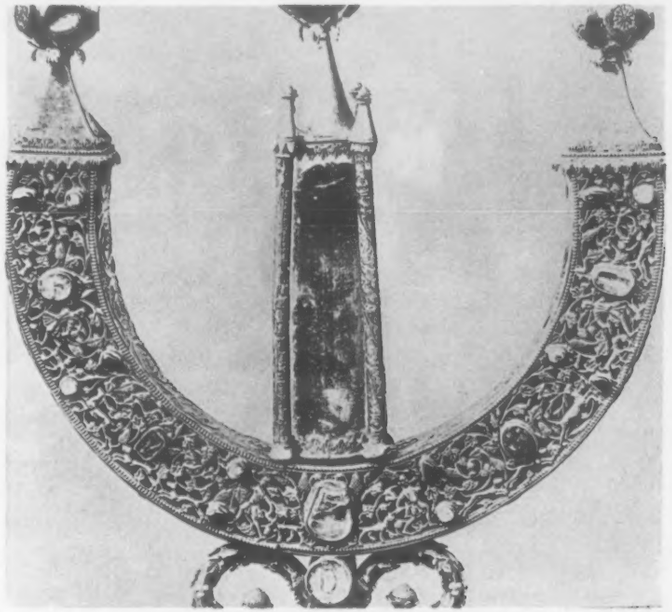


FIG. 3. Namur, Treasury of the Soeurs de Notre Dame: Detail of the St. Peter Reliquary (Phot., Courtoy & Schmitz, pl. VI)

NOTES

A COPPER-GILT SHRINE IN THE MUSEO SACRO OF THE VATICAN LIBRARY

VIRGINIA WYLIE

In the Flemish region bounded by the Meuse, Sambre, and Scheldt rivers, goldsmith work flourished in the thirteenth century under the influence of such skillful artists as Hugo d'Oignies and Nicholas of Verdun. To the considerable number of objects which have been attributed to minor artists of this region and period, I should like to add a copper-gilt shrine in the Museo Sacro of the Vatican Library. This work, I believe, has been mistakenly considered of English provenance[1] and dated too late, from the fourteenth to the sixteenth century.[2]

The shrine (Fig. 1) is composed of a central niche flanked by four wings which are hinged together and can be closed around the niche.[3] The central section is surmounted by a spire and rests on a base decorated with a band of foliate openwork and supported by four animal legs. A statuette of the Virgin Mary and Christ Child[4] originally stood in the niche in a position indicated by the remaining enameled nimbus[5] and the hole in the floor of the shrine.

The wings are engraved on their inner surfaces with the figures of four angels in the gables, and below with scenes from the history of the infancy of Christ. On the left wings, one observes the *Annunciation to the Virgin*, the *Visitation*, the *Nativity*, the *Annunciation to the Shepherds*, and the *Adoration of the Magi*; and on the right wings, the *Flight into Egypt* and the *Fall of Idols*, the *Massacre of the Innocents*, and the *Presentation of Christ in the Temple*. These scenes are enclosed in arcades and arranged in three zones.

The general iconographic pattern of this shrine is commonly found in thirteenth and fourteenth-century art of western Europe, but certain details relate it to Flemish works of the thirteenth century. In the scene of the *Annunciation to the Virgin*, the figure of Gabriel is represented as wingless.[6] This indifference to an essential attribute of archangels is rare, but is also found on the reliquary-casket of Notre Dame, in Tournai, which Nicholas of Verdun completed in 1205.[7] Here, the figure is practically in the round and one might suppose that the absence of wings was due merely to a technical difficulty. However, in the corner spandrels of the same casket and in the scenes of the *Nativity* and the *Holy Women at the Sepulcher*, the angels are also practically in the round and in these instances they are winged. Again, one observes a wingless Gabriel on the reliquary-casket of St. Eleutherius which was made about 1247 in Tournai or its vicinity.[8]

The most interesting feature of the *Nativity* scene on the Vatican shrine is the crib. It is composed of a flat top supported by a single column, and it resembles actual table-altars in form.[9] We do not know the origin of the conception of the Christ Child placed as an offering on an altar, but in the tenth century Walafrid Strabo wrote, "Ponitur in praesepio id est corpus Christi [ponitur] super altare,"[10] and some such commentary may have influenced mediaeval artists in the rendering of the crib in the *Nativity*. This type of altar-crib was particularly popular in thirteenth-century works of Flemish and Rhenish origin. The closest parallel to the one represented on the Vatican tabernacle is found in the late thirteenth-century, Liége psalter of Lambert le Bègue in Paris.[11]

In most of the scenes on our shrine the arcades serve merely as frames to enclose the figures, but in the *Flight into Egypt* the spatial conception is different. Here, the bridle of the ass passes behind the column and the architecture thus becomes an integral part of the scene. It is interesting and I believe significant that the only other instance of this feature which I know is found on a shrine in the Metropolitan Museum of Art which has been attributed to Flemish workmanship of the second half of the thirteenth century.[12]

The chalice represented on the altar in the *Presentation* scene closely resembles those depicted on the base of the cross in the treasury of St. Materne at Walcourt,[13] and on a Crucifixion plaque in the British Museum,[14] both of which are of Flemish provenance and belong to the third quarter of the thirteenth century. The form of all three of these is similar to that of the beautiful chalice signed by Hugo d'Oignies, and preserved in the treasury of the Soeurs de Notre Dame in Namur.[15]

Flemish goldsmith work of the thirteenth century furnishes the closest analogies to the form, technique, and style of the Vatican tabernacle. A shrine from the Minorite monastery in Tournai, now in the Schloss Museum in Berlin, has the same essential features of form as the Vatican piece (Fig. 4). Each is composed of a central niche surmounted by a trefoil arch, gable, and octagonal spire, and flanked by four wings of which the two on the inside are wider than the outer ones. The Schloss Museum

1. According to the latest information which I obtained from the Museo Sacro, in 1939, the shrine was labelled, "Inglese."

2. Giovanni Battista De Rossi in his unpublished inventory of the objects in the Museo Sacro describes this shrine as No. 727. He dates the major part of the tabernacle in the fourteenth century and the base in the fifteenth or sixteenth century.

3. Height, 33 cm.; width with wings open, 25 cm.; height from the floor of the tabernacle to the center of the nimbus, *ca.* 10.6 cm.

4. Although we have no description of this statuette we may assume that it was a Virgin Mary and Christ Child since these figures are necessary to complete the scene of the *Adoration of the Magi* represented on the inner left wing. This statuette was reported missing as early as 1867 in Xavier Barbier de Montault, *La bibliothèque vaticane*, Rome, 1867, p. 106, no. 493.

5. The nimbus is made of a type of champlevé enamel frequently found on Flemish and Rhenish works of the thirteenth century. The ornament is composed of a blue trefoil on a blue-green ground and three yellow and three white cinquefoils.

6. The absence of wings on this figure of Gabriel undoubtedly accounts for the failure of Barbier de Montault (*op. cit.*, p. 106, no. 493) to recognize this scene as an *Annunciation* and explains his incorrect identification of this figure as John the Baptist.

7. Joseph Warichez, *La cathédrale de Tournai*, Brussels, 1934–35, I, pl. LXX (136).

8. *Ibid.*, I, pl. LXXIV (146).

9. Joseph Braun, *Der christliche Altar*, Munich, 1924, I, pp. 131 ff.; figs. pp. 130, 132; pl. 7 (S. 121).

10. *Biblia latina cum ordinaria Walafridi Strabonis et interlineari Anselmi Laudunensis* (place of publication unknown), 1480?, IV, Luke II.

11. Paris, Bibliothèque Nationale, Ms. lat. 1077, fol. 9 v. Frederik Lyna, *De vlaamsche miniatur van 1200 tot 1530*, Brussels, 1933, fig. 12.

12. Samson Lane Faison, "A Gothic Reliquary in the Metropolitan Museum of Art, New York City," *Revue belge d'archéologie et d'histoire de l'art*, VI, 1936, pp. 133 ff.; fig. 1. Accession number of the Metropolitan Museum is 17. 19. 502.

13. Joseph de Borchgrave d'Altena, "Le trésor et le mobilier de l'église Saint Materne à Walcourt," *Bulletin de la société d'archéologie de Bruxelles*, II, May–October, 1938, p. 51.

14. Joseph de Borchgrave d'Altena, "La chasse de Saint Symphorien," *Revue belge*, III, 1933, p. 338; fig. 9.

15. Ferdinand Courtoy and Jean Schmitz, *Memorial de l'exposition des trésors d'art, Namur, 1930*, Namur, 1932, p. 18; pl. VII.

shrine has been dated *circa* 1270,[16] at a period between the triptych in the Louvre which was commissioned for the abbey of Floreffe in 1254,[17] and the St. Gertrude reliquary of Nivelles which was made between the years 1272 and 1298.[18] The technique of engraving figures on a metal ground with a slight appearance of relief and the type of foliate ornament engraved on the background, as well as the brickwork and crockets on the tower and spire, and the use of oak leaves, relate this Tournai shrine to the Floreffe triptych. But on the other hand, the plastic treatment of the figures and drapery, the use of maple leaves on the gable, and the absence of foliate openwork, associate this work with the St. Gertrude reliquary.

The base of the Vatican shrine is decorated with a band of foliate openwork (Fig. 2) characteristic of the work of Hugo d'Oignies and other thirteenth-century Flemish goldsmiths. This technique of soldering stamped leaves to curving stems was used on the pair of bookcovers[19] and the St. Peter reliquary of 1228 (Fig. 3)[20] made by Hugo d'Oignies and preserved in the treasury of the Soeurs de Notre Dame at Namur; on the cross (Fig. 6) and the reliquary of the True Cross in the treasury of St. Materne at Walcourt;[21] on the Floreffe triptych in the Louvre; and on several other works.[22]

Although the technique of rendering the foliage is the same in all these examples, a close examination reveals certain differences. The work of Hugo d'Oignies is characterized by figures of men and animals interspersed among the foliage, but these are absent from the decoration on the Vatican shrine and most of the other works which have been cited.[23] The ornament on a processional cross in the Museo Sacro of the Vatican Library[24] and on a cross in the Hermitage Museum in Leningrad[25] also differs from that of our tabernacle in the softer appearance of the foliage and the freer arrangement of the leaves. The five stamps for the leaves on the Vatican base are closely related, however, to those on the Walcourt cross and reliquary which should be dated close to the Floreffe triptych, commissioned in 1254.[26]

16. Otto von Falke, "Ein frühgotischer Marienaltar aus Tournai," *Berliner Museen, amtliche Berichte*, XXXIX, 1918, cols. 165 ff.

17. Margarete Fugmann, *Frühgotische Reliquaire. Ein Beitrag zur rheinisch belgischen Goldschmiedekunst des 13. Jahrhunderts*, Leipzig, 1931, pp. 43 ff.

18. Chrétien César Auguste Dehaisnes, *Documents et extraits divers concernant l'histoire de l'art dans la Flandre*, Lille, 1886, Pt. I, pp. 64 ff.

19. Courtoy and Schmitz, *op. cit.*, pp. 15 ff.; pls. IV, V.

20. *Ibid.*, pp. 17 ff.; pl. VI.

21. *Ibid.*, pp. 20 ff.; pl. IX.

22. (a) A chalice at Borga; H. P. Mitchell, "Some Works by the Goldsmiths of Oignies," *Burlington Magazine*, XXXIX, 1921, pp. 274, 279; pl. VI. (b) A crozier head in the British Museum; Ormonde Maddock Dalton and A. B. Tonnochy, *British Museum, a Guide to the Mediaeval Antiquities and Objects of Later Date in the Department of British and Mediaeval Antiquities*, London, 1924, pl. IV. (c) A cross in the Victoria and Albert Museum; H. P. Mitchell, *op. cit.*, p. 273; pl. V(G). (d) A cross in the Arenberg collection; M. G. Terme, *Exposition universelle 1905; l'art ancien au pays de Liège*, Liège, 1910, III, pl. 26. (e) The reliquary of St. Eleutherius, Tournai Cathedral; J. Warichez, *op. cit.*, I, pl. LXXVI. (f) A processional cross in the Museo Sacro of the Vatican Library; S. L. Faison, "A Gothic Processional Cross in the Museo Cristiano," ART BULLETIN, XVII, 1935, pp. 163 ff.; fig. 10. (g) A cross in the Hermitage Museum, Leningrad; A. N. Kube, "Croix-reliquaire de l'Ermitage," *Seminarium Kondakovianum*, II, 1928, pp. 25 ff.; pl. IV. (h) The St. Blasius book cover in the monastery of St. Paul in Carinthia; O. von Falke, "Das frühgotische Kunstgewerbe im 13. und 14. Jahrhundert," in Georg Hermann Lehnert, *Illustrierte Geschichte des Kunstgewerbes*, Berlin, 1907–09?, I, p. 312; pl. opp. p. 312.

23. These figures, however, also appear on a small strip of foliate openwork on the St. Eleutherius reliquary (L. Cloquet, "La châsse de Saint Éleuthère à Tournai," *Revue de l'art chrétien*, VII, 1889, p. 194; fig. 1, 1), and on the processional cross in the Museo Sacro (S. L. Faison, ART BULLETIN, XVII, 1935, p. 170).

24. Faison, ART BULLETIN, XVII, 1935, pp. 163 ff.; fig. 10.

25. Kube, *op. cit.*, pp. 25 ff.; pl. IV.

26. The foliate openwork and figural style of the Walcourt cross and reliquary relate these works to the Floreffe triptych. The engraved foliate ornament and the supporting lions of the cross and triptych are also comparable, and the decoration of brickwork appears on both the Floreffe work and the Walcourt reliquary.

The engraved figures on the Vatican shrine (Fig. 1) are comparable in technique and style to those on the Walcourt cross (Fig. 7) and on the plaque on the back of the Vierge de Pèlerinage in the treasury of St. Materne at Walcourt (Fig. 8). In each of these examples the engraving is made on a metal ground without the use of enamel and the lines are incised into the plate without creating an effect of relief. The figural style of these three works exhibits an angular, unfunctional character of line and a stiffness and awkwardness of position and gesture. We have already related the Walcourt cross to the Floreffe triptych and we may now enlarge the group to include the Vatican shrine and the plaque on the back of the Vierge de Pèlerinage.

The study of iconography, style, and technique indicates, I believe, a Flemish provenance for the Vatican shrine. The date of this work is indicated by its relation on the one hand to the Floreffe triptych, commissioned in 1254, and on the other hand to the Schloss Museum shrine of *circa* 1270. The Vatican shrine, therefore, should be given its rightful place as a product of Flemish workmanship of the third quarter of the thirteenth century.

INDEX OF CHRISTIAN ART,
PRINCETON, NEW JERSEY.

A PERUVIAN CATAFALQUE

NATHALIE H. ZIMMERN

In a recent survey of Peruvian colonial tapestries, the identification of a rare catafalque now in the Textile Museum of the District of Columbia constituted the first step in precisely dating these weavings.[1] Made of alpaca and cotton,[2] the fabric is decorated with four figures set in niches with floral scrolls above and below, all of these executed in red, blue, white and gold on a dark brown background (Fig. 1A, B). The principal figures are two skeletons. One wears a royal crown and holds a scepter and a mace, and the other wears a papal tiara and holds a cross, leaving no doubt that the two main figures represent a King and a Pope. The mutilated ends indicate that originally the piece was larger and probably included another panel or panels. It is likely that the cloth covered the front of an altar. The rectangular shape of the textile and certainly the width (5′ 5½″ by 3′ 4½″) support such a theory. It has also been suggested that the catafalque may have been cylindrical.[3] The only actual information we have concerning this piece is that it was acquired more than twenty-five years ago, in Chile, where it was said to be an altar cloth from Peru.

It is not common to be confronted with realistic pictures of the skeletons of persons as important as the head of the church and the head of the state. Certainly this intimate conception of these personages is rare in the Old World. It is unusual in Latin America. So far as we know, the subject is unique in Peruvian weaving, and we have found no evidence of similar representations in any other arts of colonial Peru. But we do find a clue to the purpose of the cloth in the reproduction of a catafalque in a Mexican church in Coatepec. There, in the year 1700, the obsequies for Charles II were celebrated upon a stage set up at the altar and surmounted by the King's skeletal representation

1. Nathalie Herman Zimmern, "The Tapestries of Colonial Peru," *Brooklyn Museum Journal*, 1943–1944, pp. 27–52, plates.

2. These materials were also used very frequently during pre-Spanish times. Indeed, it has been said that alpaca and cotton clothed the Inca subjects. Ricardo Cappa, *Estudios críticos acerca de la dominación española en América*, Madrid, 1889–97, VII, p. 1.

3. An example of a cylindrical textile, ornamented with skulls and crossbones, and carried on a standard, is shown by Felipe Huaman Poma de Ayala, "Nueva coronica y buen gobierno," Paris, Institut d'ethnologie, Travaux et mémoires, XXIII, 1936, p. 619 (written 1583–1613).

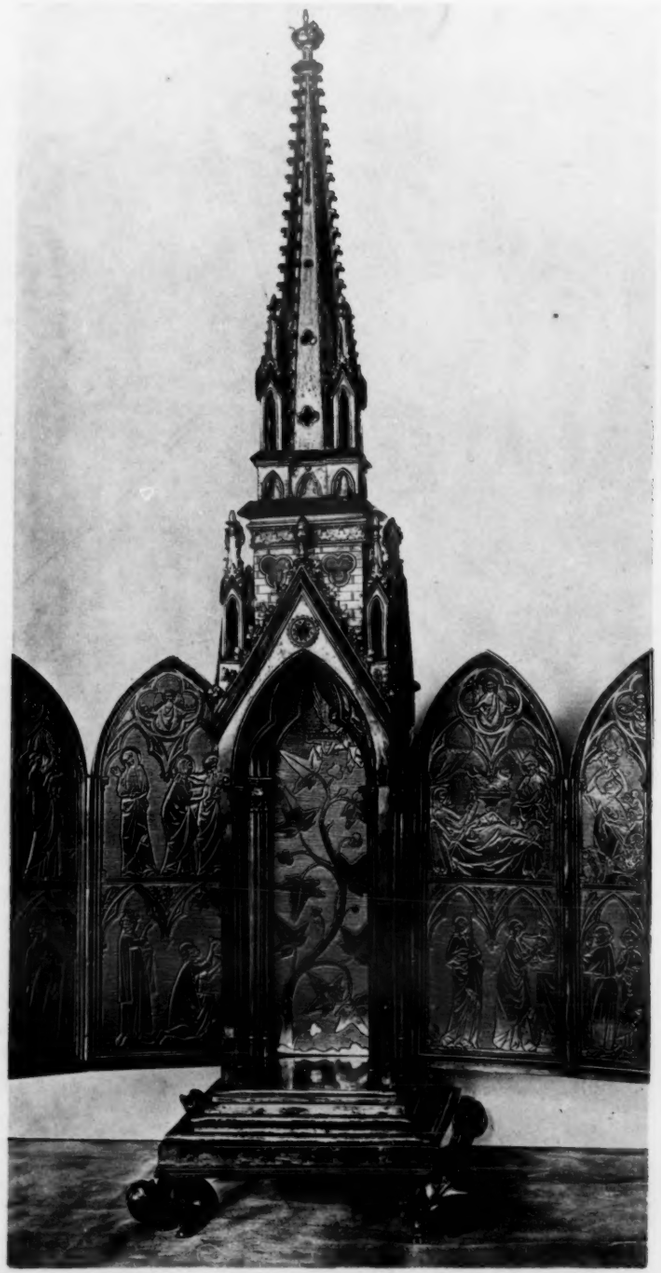


FIG. 4. Berlin, Schloss Museum: Shrine (Phot., Schloss Mus.)

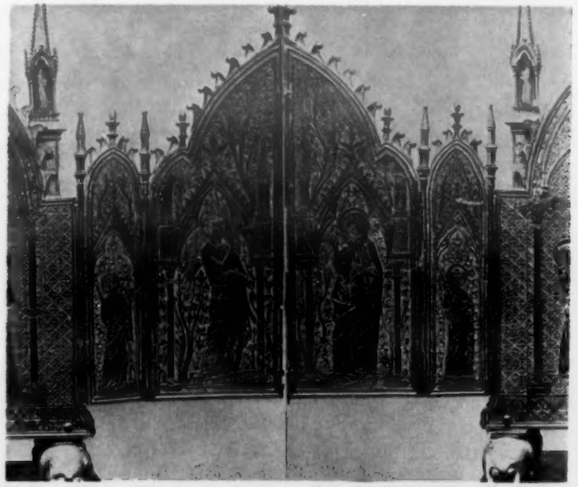


FIG. 5. Paris, Musée du Louvre: Detail of the Floreffe Triptych (Phot., E. Molinier, *Donation Rothschild*, 1902, pl. II)

FIG. 6. Walcourt, Treasury of St. Materne: Detail of Obverse of Cross (Phot., Mus. Roy. Bruxelles)

FIG. 7. Walcourt, Treasury of St. Materne: Detail of Reverse of Cross (Phot., Mus. Roy. Bruxelles)

FIG. 8. Walcourt, Treasury of St. Materne: Plaque on the Back of the Vierge de Pèlerinage (Phot., Mus. Roy. Bruxelles)

FIG. 1A.

FIG. 1B.

FIGS. 1A and 1B. District of Columbia, Textile Museum: Peruvian Catafalque, 1621, Memorializing Pope Paul V and Philip III of Spain

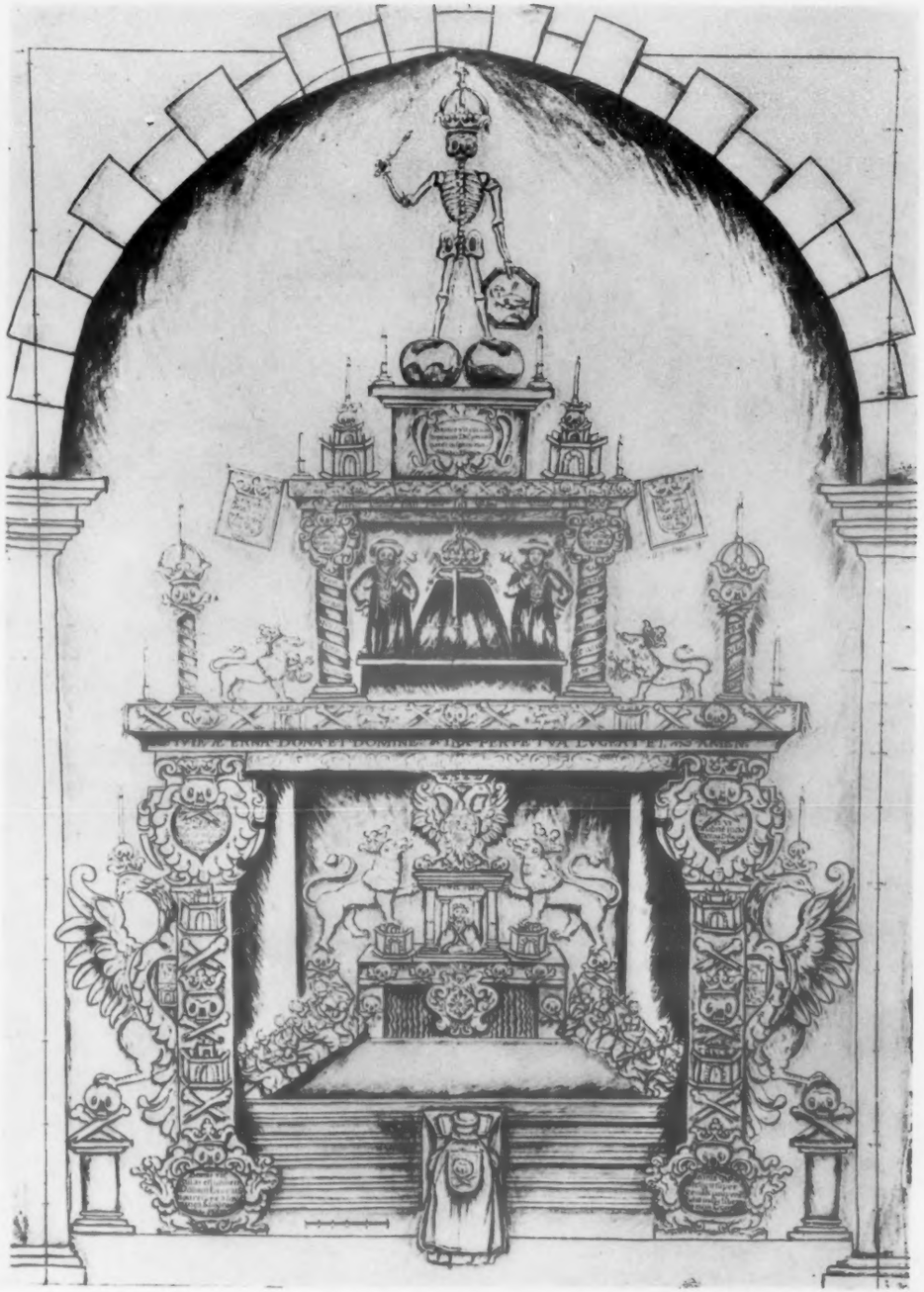


FIG. 2. Coatepec (Mexico): Catafalque Commemorating Charles II, 1700

(Fig. 2). The similarities between this royal figure and the one on our tapestry lead us to believe that the Peruvian example served in South America to honor a deceased Spanish King and a Pope. Since such memorials were constructed shortly after the death of prominent people, we may try to determine which Pope and which King are pictured, in the hope of naming the year in which the cloth was manufactured.

Before this textile was precisely dated it had been ascribed to the 17th century on the basis of style. In fact, this was the only method for dating the colonial tapestries of Peru,[4] and there were no historic textiles to serve as guides until this piece appeared. In designating the century or part of a century in which each colonial tapestry was made, the author, in an earlier publication, depended not only upon the stylistic features but also upon iconography and the probable use of each specimen.[5] The first step in dating colonial tapestries was based on Bandelier's finds of post-Conquest shirts in Inca burials.[6] These were garments of native cut, but they showed Spanish influence in the motifs or in materials. We can be fairly certain that such garments belong only to the early Hispanic period, that is the sixteenth century, because edicts and historical records show that certain forms of native dress could not have continued long after 1572.[7] No post-Conquest shirts have complicated designs. They are not known, moreover, to be ornamented with elaborate scrolls or prominent borders. Their particular decoration gives us a stylistic basis for analyzing all other colonial tapestry weavings. Thus we may infer that simple, freely executed designs preceded the elaborate composition, and complicated borders and motifs which are almost completely Spanish in origin.

In the case of the catafalque we assigned an early seventeenth century date for several reasons. First, the realism and simplicity with which the skeletal figures are depicted indicate an early date in the post-Conquest period. By the end of the seventeenth century, and certainly during the eighteenth century, the designs had become more stylized and complicated. Second, borders of simple flowers and stems, such as we find on our tapestry, have been identified with the early seventeenth century. Such early tapestries lacked the elaborate vines, vases, etc. which we find used in the prominent borders at the end of the century. Third, the scattering of small details throughout the main design, as with the flowers and petals we see here, disappeared from the formal compositions of the late seventeenth and eighteenth centuries. Fourth, the dark background and the clear primary colors of our tapestry show none of the shading and soft tones which became popular by the end of the seventeenth century.

Searching the records we find that until the eighteenth century there was only one year, 1621, in which both a Pope and a Spanish King died. Pope Paul V departed this life on January 28th and Philip III was dead two months later on March 31st. In many parts of Spain and the colonies this double loss may have been commemorated by elaborate ceremonies, and it is likely that various kinds of memorials were erected. We know that on April 1st, Philip IV sent a letter to Peru in which he told of the death of his father and asked that respect be shown to the former King by mourning draperies and greater splendor than had ever before been displayed. According to Montesinos' report for 1621: "Entró en el Gobierno de los Reynos y monarquía española Phelipe 4. el Grande; dió aviso al Reyno del Pirú por carta fecha en Madrid, á 1 de Abril deste año de cómo murió su Santo Padre Felipe 3. á postrero de Março del mesmo año, encargando a las çiudades hiçiesen las obsequias con los lutos y demostraçión que se solía haçer en casos semejantes; hiçiéronse en todo el Reyno con la magestad y pompa mayor que hasta entonçes se avía visto, procurando cada çiudad aventajar la pompa para muestra de su mayor sentimiento."[8]

In the history of Spain there was but one other year, 1700, in which both a Pope and a King died. At that time Innocent XII died on June 27th and Charles II on November 1st. We may be quite certain, however, that the Textile Museum altar cloth does not commemorate this event, because, as suggested above, the style, size, and colors indicate an early seventeenth-century period. Furthermore, the crown worn by the King is not the modern arched crown surmounted by a cross, such as we see in the Coatepec representation of 1700. Rather is it related to the earlier open diadem of Spain, which was a circle of gold ornamented with eight leaves and with precious stones, but not closed with arches. The arched crown replaced the diadem when Philip II married Mary, Queen of England, in 1554.[9] It is possible that in 1621 the Peruvian who wove this textile was more familiar with representations of the older crown than he was with the new one. But it is less likely that this would have been the case in 1700, as we see in the Mexican catafalque, where the crown is accurately represented.

The tiara worn by the Pope consists of three open crowns of gold, placed one above the other. Two cloth bands or infulae hang from it. This tiara is the form which had been in use since the fourteenth century. Certain details are missing from the representation, such as the openwork in each diadem, the fleur de lys, and the ball beneath the cross. Yet the tiara is unmistakably that worn only by the Pope. In the King's crown, the lack of a division in the arches and the cross on top, still does not detract from the fact that the crown resembles only that worn by the Spanish monarch.

We should not consider it strange that a Peruvian represented the dead Pope and King as skeletons. His ancestors had often painted dead men on pottery and they had also depicted their various gods as having human and animal attributes. Therefore, the weaver of this tapestry would not have thought it disrespectful to portray the head of the church and the head of the state as dead mortals. In other words, after the Conquest the Indian assimilated many Old World teachings but these did not become substitutes for his own traditions. He rather combined European concepts with the ancient patterns of his people.

The attendants, dressed in blue and gold, are associated with the Pope by the crosses which they carry. The red skin of half the face, one hand and one leg of each figure identifies them as Indians. What did the weaver have in mind when he portrayed half-alive and half-dead figures? Perhaps he wished to imply that part of the person died when he lost his master; or it may be that the skeletal portion simply expressed the funereal nature of the memorial. Or possibly the Peruvian intended to signify that the Indians were loyal servants of the Pope, because Paul V had tried to protect them even after they were dead. In 1607 he had decreed that the church was not to charge the Indians exorbitant amounts for burials, indicating that the head of the

4. Thomas Joyce, "A Peruvian Tapestry, Probably of the 17th Century," *Burlington Magazine*, XXIII, 1913, p. 150; A. F. Kendrick, "A Peruvian Tapestry," *Burlington Magazine*, XLVII, 1925, p. 297; Philip Ainsworth Means, *A Study of Peruvian Textiles, Illustrated by Representative Examples in the Museum of Fine Arts, Boston*, Boston, Museum of Fine Arts, 1932, pp. 70–73.

5. Zimmern, *op. cit.*, pp. 37–43.

6. A. F. Bandelier, *The Islands of Titicaca and Koati*, New York, 1910, p. 232.

7. *Relaciones geográficas de Indias*, Madrid, 1881–87, I, p. 189; II, pp. 45, 69; Gösta Montell, *Dress and Ornaments in Ancient Peru*, London, 1929, p. 237; Diego Rodríguez de Figueroa, "Narrative . . .," transl. and ed. by Clements R. Markham, London, Hakluyt Society, 1913.

8. Fernando Montesinos, *Anales del Peru*, Madrid, 1906, II, p. 220: "There entered in the government of the kingdoms and Spanish monarchy Philip IV the Great; he gave notice to the kingdom of Peru by a letter dated Madrid, April 1st of this year [1621] that his blessed father Philip III died on the last day of March of the same year, advising the cities to pay their respects with mourning draperies and demonstration which was usually made in similar cases; this should be done in all of the kingdom with majesty and pomp greater than had been seen up to that time, each city trying to better the pomp as a demonstration of its greater grief."

9. W. H. Abbott, *Heraldry Illustrated*, New York, 1897, p. 30.

church objected to those methods which were unfair to the natives.[10]

In the Textile Museum altar decoration the pattern of figures set in niches seems at first glance to be related to church architecture. In the Peruvian codex by Huaman Poma de Ayala, we find an illustration of Pope Leo seated on a throne against an arched background like the niche in our catafalque.[11] But it is not unlikely that both designs depended upon religious manuscripts brought from Spain, and were derived indirectly from Spanish Beatus illuminations. Ultimately, Carolingian manuscripts, Syrian miniatures and Celtic illustrations may have been the archetypes for this catafalque. A Spanish page of tables from San Isidoro, León, dated 1058, shows pillars with a design which is clearly analogous to the scrolls on the pillars of the Peruvian cloth.[12] Other interesting comparisons are a Carolingian canon table from Trier, about 775 A.D.;[13] Syrian miniatures from a famous manuscript of the seventh or eighth century,[14] and Celtic canon tables from the Lindisfarne Gospels of about 700 A.D.[15] In short, the Peruvian who wove this tapestry had come in contact with an old and varied tradition of religious iconography and design.

10. Philip Ainsworth Means, *Fall of the Inca Empire*, New York, London, 1932, p. 199.
11. Huaman Poma de Ayala, *op. cit.*, p. 39.
12. J. Domínguez Bordona, *Spanish Illumination*, New York, 1930, pl. 38A. See also plates 5A, 13, 15.
13. Adolph Goldschmidt, *German Illumination*, New York, 1928?, I, pl. 5. See also pl. 47.
14. Josef Strzygowski, *Das Etschmiadzin Evangeliar*, Vienna, 1891, pl. II, fig. 2; pl. III.
15. O. E. Saunders, *English Illumination*, New York, 1928, I, pl. III.

The borders of our tapestry are simple representations of European flowers. But below the figures of the Pope and the King several flowers and petals of native origin are shown. Most of these seem to be the *ccantu*, a bell-shaped blossom known as the Inca flower. Often on Inca pottery vases, on post-Conquest wooden cups (*keros*) and on textiles, as in this case, the flower is conventionalized to resemble an arrow. Of all the Peruvian plants the *ccantu* has been most frequently used in art, because it was the favorite and sacred bloom of the Inca ruler. It is also said to have been used as a symbol of submission on pre-Spanish artifacts; and we know that it was associated with funeral rites. Even today, the Indians of some provinces carry on the custom of adorning the dead with *ccantu* flowers, which they believe contain the sap necessary to quench the thirst of the dead during the long journey beyond the grave.[16]

The identification and dating of this fabric give, then, the first securely dated historic tapestry from colonial Peru to be found in United States collections. Of all garments, church pieces, and wall hangings, which show both native and Old World elements, this piece alone has revealed the year of its manufacture, namely, 1621. The subject matter is unusual; but the treatment is typical of the way in which Peruvians selected and re-evaluated certain elements from the beliefs and customs of the Old World together with ideas and symbols from their own inheritance.

BROOKLYN MUSEUM

16. F. L. Herrera and Eugenio Yacovleff, "El mundo vegetal de los antiguos peruanos (conclusión)," *Revista del Museo nacional*, Lima, IV, no. 1, 1935, pp. 59–61.

BOOK REVIEWS

CHARLES DE TOLNAY, *The Youth of Michelangelo*, Princeton University Press, Princeton, 1943. Pp. XIII + 295; 292 ills. $15.00.

No book on Michelangelo can ever hope to capture the whole of his genius. The liberal romanticism of Grimm, the Nietzsche-inspired psychology of Thode, bear the unmistakable mark of their times. Yet, these books are far from being useless today. Grimm's interest, like that of Justi, may be centered on the artist expressing himself within his world, rather than on his art, but such a limitation in scope is compensated by an historical perspective of great wealth and penetration. The genius, his work, and the history of his world all are felt to be animated by the same dark forces; the symbolic value of history is used as a substitute for the symbolic value of art.

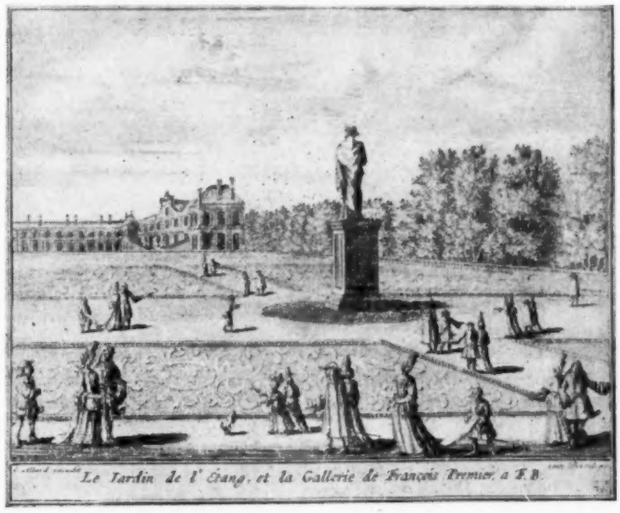
Thode lacked the universality of Grimm's historical and philosophical imagination. In a less ambitious way he also built up a world, but one where every detail reflected the hero's personality. With the painstaking industry of his generation he collected the material so fully and discussed it so thoroughly that, however mistaken some of the conclusions, his book still is the basis of all later work in the field.

It is this comprehensive quality that has preserved the work of the great historians of a bygone generation from ageing. Books in this deeper sense of the word are rarely written today. Most of our books are mere treatises pursuing with great erudition one thin thread of favorite thought. One finds psychological and philosophical theories, of sometimes dubious applicability, aiming at the contents rather than at the form of the work of art; we seem farther today from grasping the autonomous validity of artistic form than Grimm eighty years ago, despite his indirect approach through the medium of history.

The difficulties of this situation are apparent in the book under review. *The Youth of Michelangelo* covers Michelangelo's development up to the moment of his departure for Rome in 1508; announced as a first volume, with several others to follow covering the later periods of Michelangelo's life, it runs into some 260 pages of text. Less than 100 of these are devoted to a discursive narrative subdivided into the sections: "Life" and "Artistic Development," while an equal number of pages contain a critical catalogue. The separation of the "life" from the "artistic development" the author tries to justify by the assumption of a deep cleft between Michelangelo the artist and Michelangelo the "social being," the "Florentine bourgeois" with "the feeling of inferiority characteristic of the déclassé" (p. 8), "the human greatness of [whose] character perhaps lies in his having succeeded in suppressing his inherited personality and in having become the docile and humble organ of his spiritual vocation" (p. 9).

We are aware of the fact that the work of a genius is influenced only to a limited extent by his life (possibly with the exception of some romantics). Still the solution of the problem is hardly quite so simple. The foregoing quotations give a strange picture of the man who defied a Julius II and who is found among the last defenders of Florentine liberty in 1529. In contrast to the historical romanticism of Grimm this dialectic distinction between the man and the artist threatens to lift the works of the genius out of time and space; then indeed they would have nothing in common with the trivial life of the individual who happened to produce them. If we take this idea seriously we would expect the first section to contain no more than the bare facts of Michelangelo's life. Instead, very naturally, the author is unable to separate the biography from a discussion of the works, which is taken up again in the chapter on the development, and finally a third time in the catalogue. All the facts about Michelangelo's artistic career which the author chooses to report are thus mentioned three times in three different places considerably swelling the volume of the book, but straining the reader's patience.

In the introduction the author claims that "the presentation [of the life of Michelangelo] is based on the primary sources," emphasizing the inclusion of unpublished material. One is disappointed to find that this promise is not fulfilled. The author bases the narrative, as was to be expected, especially for the youth of Michelangelo, no less on Vasari and Condivi than any of his predecessors.



Engraving by Joannes Lamsvelt from *Edifice et Campagne de Délices à Fontainebleau par Charles Allard*, Amsterdam, n.d.

The astonishingly short section on the artistic development divides the twenty years from 1489–1508 into five periods. These are characterized in the headings as: "Primordial Visions of Life and Destiny," "Differentiation of Emotions," "Differentiation of Outward Form," "Differentiation of Inward Structure: Classical Style," and finally "Return to the Vision of Preterhuman Forces." The change from philosophical to psychological categories, then to categories of form and finally back to philosophy makes it difficult to connect one group with the next as steps in an evolution and no attempt is made in that direction. Here again the dialectic character of the argument becomes clear as it moves along antithetical rather than historical lines. This tendency even carries an esoteric interpretation into mere historical facts behind which the simple historian fails to see any deeper significance. Contemporary works are interpreted as corresponding pairs: the *Battle of Centaurs*, and the *Virgin of the Stairs* as "life and death aspect of existence" (p. 75), the Bruges *Madonna* and the marble *David* as "antithetical Christian and pagan type [!] inspiration" (p. 99), etc. A similar pattern of thought appears in the statement that "his life was to follow the typical course of the lives of men around Lorenzo de' Medici" (p. 19). Here Michelangelo's late conversion, interpreted not as the symbol of a great artist's despair over life and art, but in its most literal sense, together with other

events of his life, seems mysteriously determined by events that had taken place more than half a century before. And again we cannot follow the author when he contrasts (p. 13) "artistic Florence with its churches and palaces filled with ancient and modern art treasures: the gleaming beauty of the Piazza del Duomo" etc. to "the festive and feminine side of the city, the Florence of the Signoria, the façades of the churches richly encrusted as though overhung with lace [?] . . ., the dark cypresses and pines in the villa gardens [which] found no echo in his soul."

It may be a result of this thinking in schematized contrasts that the importance of the later Quattrocento for the young Michelangelo is grievously underrated. Of course, no one has to be told that the *Battle* piece springs full-grown from the head of Zeus. Nevertheless, the influence of Bertoldo reaches deeper than the author assumes. The similarity pointed out by Bode, between one of the figures of this relief and Bertoldo's *Bellerophon* is by no means "a coincidence" (p. 135), despite Michelangelo's more forceful interpretation of form.[1] There was much the young sculptor could learn from Desiderio da Settignano's and Verrocchio's marvellous treatment of stone; and indeed his work between Bologna and the completion of the marble *David* is, in effect, a continuous discussion with the later Quattrocento.[2] In the text (p. 92) the facial type of Christ in the *Pietà* is considered as derived from that of Leonardo's *Last Supper*, of which "Michelangelo must have known a drawing or etching [!]." In the catalogue (p. 149) the same features of the head are traced back mainly to Verrocchio. Unfortunately the quotation: "Verrocchio (Victoria and Albert Museum)" can refer only to two very poor and insignificant school pieces while the real sources of inspiration, the early *Resurrection*, and the Forteguerri monument, are not mentioned; the latter has contributed much more than merely the type of the head.

Only after Leonardo's return to Florence can we observe definite traces of his influence upon Michelangelo. Undoubtedly Leonardo's cartoon for the *St. Anne with the Virgin* stirred the sculptor's imagination profoundly; yet his Oxford drawing of the same subject (Berenson 1561, here ill. 81), while accepting Leonardo's principle, differs in almost every detail. The author (p. 180) finds this drawing more closely related to Leonardo's sketch in the Louvre (Berenson 1070, ill. 80) than to the cartoon at Burlington House. Certainly Michelangelo's drawing is only loosely connected with the cartoon in London. It is no closer to the second cartoon, the one exhibited in 1501 which is lost but known through copies,[3] and which the author seems to confuse with the one at Burlington House. Leonardo's sketch in the Louvre is so much later[4] that Michelangelo could not have known it at the time he made the drawing now at Oxford.

The only master of the later Quattrocento who is credited with a far-reaching influence upon Michelangelo's early development is Antonio Pollaiuolo. The sole basis for this claim[5] is the charcoal drawing of a Triton in the Buonarroti's farmhouse at Settignano, first attributed to Michelangelo's youth by Gori, then to his mature years by Heath Wilson. Conversely the "Pollaiuolesque" character of the Triton is used to support the attribution, indeed a vicious circle. To Berenson's remarks[6] against the author's early dating (formerly around 1489, now before 1488) should be added the argument that the foreshortening of the right arm is impossible in Michelangelo's early work, even apart from the extreme weakness of execution (compare the reluctance to follow Masaccio in this respect in the hand of the Munich drawing of St. Peter). Berenson is reminded of the Giuliano in the Medici Chapel and the Cavalieri drawings. There should then be no doubt that this is the work of an ardent, but ungifted admirer, done probably after the master had left Florence.

It is only natural for the biographer to overrate the importance of his hero. In the case of Michelangelo that seems hardly possible. Still we believe that the following conclusion is not valid: a new type of crucifix appears in Florence before 1496; Michelangelo is known to have made a crucifix about that time; therefore the new type, showing a "contraposto" movement of the limbs was invented by Michelangelo. The author believes to have found in Santo Spirito a copy of the lost cross made by Michelangelo for that church. The "copy," which can hardly be later than 1500, shows no resemblance to Michelangelo's style; the contraposto would be its only Michelangelesque feature. Now the new type is seen for the first time in Benedetto da Majano's large crucifix in the Cathedral, a work that does not yet show the full development of Benedetto's last works, the St. Sebastian and the Madonna in the *Misericordia* of *ca.* 1497. Benedetto's crucifix must therefore be dated early in the 'nineties; in all probability it precedes Michelangelo's. Why then should he not have "invented" the new type? His Madonna in the *Misericordia* is very inadequately described elsewhere in this book (p. 99) as "tender and charming"; in reality it is a very unlovely and heavy work. This heaviness and the pronounced contraposto which also appear in the St. Sebastian reveal surprisingly strong Cinquecento tendencies. Is it not more likely that Perugino and Baccio da Montelupo, a follower of Benedetto, should have taken over the type from the leading sculptor of the day rather than from a mere beginner?[7]

Another lost work of which the author believes to have found a trace is the marble *Hercules* of 1492. Under Henry IV this statue was placed on a small island in the palace grounds of Fontainebleau, and in 1713 it disappeared during the remodelling of the gardens. In an etching by Nicolas Perelle of *ca.* 1660 it is seen in the center of its island, with a statue on either side. This print (fig. 153) is too small in scale to be useful. An etching by Israel Silvestre (fig. 152) shows a larger statue, seen from the back and facing the Cour de la Fontaine of the Palace. This the author believes to be the lost *Hercules*. However, the position of the figure in relation to the long central part of the buildings forming the court leaves no doubt that this is the statue on the right hand side of the *Hercules*. As such it appears in a second etching by Silvestre not considered by the author, with the real *Hercules* in the center looking quite different from this effeminate figure with the draperies falling down to its feet. In a print published about 1700 by C. Allard (see Fig. 1) this statue is seen in a rear view similar to that given by Silvestre, but not based on it. Here its sex is revealed beyond any doubt: it is a Flora or some other female figure, part of the decoration of the little island

1. The figure is clearly derived from the type of the Dioscures, *via* the *Bellerophon*. It is difficult to understand how the author can connect this pose with that of "the" Discobolus, on the basis of an extremely superficial comparison with ancient gems made by A. Heckler ("Michelangelo und die Antike," *Wiener Jahrbuch f. Kunstgeschichte*, VII, 1930, pp. 203–4).

2. By ignoring the influence of these and other masters, and underestimating even that of Donatello, the author follows the traditional trend of writing on Michelangelo. The opposite view will be developed in a paper on various Michelangelo problems prepared by this reviewer.

3. W. Suida, *Leonardo und sein Kreis*, Munich, 1929, p. 131; Kenneth Clark, *Leonardo da Vinci*, New York, 1939, p. 110; Langton Douglas, *Leonardo da Vinci*, Chicago, 1944, p. 26.

4. Clark, *op. cit.*, p. 153 and pl. 51: 1508–10. The decisive change in the position of the Virgin's legs places this drawing after the cartoon of 1501 as a step in the direction of the Louvre painting.

5. The statement (p. 242) that Pollaiuolo's influence "breaks through repeatedly [later], e.g., in the Doni Madonna, the Battle of Cascina and even in the Last Judgment" is exaggerated. The linearism of the Doni *Madonna* and the Cartoon is based on a common Florentine tradition, and the rapidly moving figures with pierced outlines in Pollaiuolo's *Battle of the Nudes* are severely criticized at the very beginning of Michelangelo's career in the *Battle of the Centaurs*. Later, after the return from Bologna, he shows greater understanding of this style. In the *Last Judgment* we (and Vasari) can only see Signorelli.

6. *The Drawings of the Florentine Painters*, Chicago, 1938: 1462 A.

7. The author assumes 1492 as the date of the lost crucifix.

when it was built under Henry IV, and probably the work of some pupil of Barthélemy Prieur.[8]

The catalogue lists the four statues done in 1504 for the Piccolomini altar among the apocryphal and falsely attributed works. This is done on the basis of a letter written to Michelangelo by his father in 1510, concerning Matteo di Cuccarello, the stonecutter who demands payment for four marble blocks intended for the Cardinal of Siena. Michelangelo had passed them on to Baccio da Montelupo and the latter now insists that he had already paid Michelangelo for them. From these facts the conclusion is drawn that Baccio made the four Michelangelesque statues still on the monument, after drawings by Michelangelo (p. 230). There are several flaws in this surprising theory. The style of Baccio da Montelupo is well known to every serious student of Florentine sculpture, and the four statues do not show the faintest trace of it. It is inconceivable that Baccio, even if he used Michelangelo's drawings, could have renounced his own personality to this extent. How close the figures of the pope and the bishop are to Michelangelo's style was recently proved by a comparison with the unfinished statue of Julius II,[9] done shortly later for the first project of the Pope's tomb. Let us assume for a moment that Baccio, relying exclusively upon Michelangelo's instruction, worked the four statues; they would then have to be classified not as apocryphal, but as school pieces (which they actually are, in varying degrees), and Baccio would have been Michelangelo's assistant. In that case, why should he have paid Michelangelo for the marble blocks? Again, if the four statues for which Michelangelo was paid in 1504 had been made from these blocks, would Matteo di Cuccarello have waited six years without receiving any payment? The blocks were probably ordered for the next series of statues after the first four had been completed. Michelangelo, presumably in 1508 before he left for Rome, sold them to Baccio for whatever purpose the latter intended to use them.[10]

When it comes to the really apocryphal works the author's task is comparatively easy: nobody today accepts the Berlin *Apollo* and *Giovannino* as works of Michelangelo, and the same holds good for the Morgan *Giovannino*. The London *Cupid* has been convincingly attributed to Vincenzo Danti by Kriegbaum. However, the author's method of dealing with these sculptures is unfortunate: by quoting (p. 234) only the first edition (1913) of Frieda Schottmüller's catalogue of Italian sculpture in the Berlin Museum, which accepts the *Apollo*, he creates the impression of not knowing that in the second edition, published in 1933, this statuette is dated not before the last third of the sixteenth century. The Berlin *Giovannino* is described by the author (p. 200) as "very close to the fountain statue of a youth in the Schlichting Collection wrongly attributed to Tribolo and to the *David* of Francavilla, also in the Louvre." Here M. de Tolnay has overlooked Middeldorf's article[11] in which the Schlichting river-god was restored to its author, Pierino da Vinci, on the basis of style and of an explicit description by Vasari. Pierino da Vinci and Francavilla are fifty years apart; their statues have as little in common with each other as with the Berlin *Giovannino*. Again we refer the reader to the excellent analysis of the latter in Schottmüller's catalogue, second edition. The Morgan *Giovannino* is called (p. 200) a typical work of Silvio Cosini. The statue itself, in its less than mediocre style, is profoundly uninteresting. It is, however, methodologically important to see that this style does not relapse into, but painfully emerges from the Quattrocento. We prefer Middeldorf's attribution to Gianfrancesco Rustici.[12] The same methodological objection applies to the treatment of the "paintings falsely attributed to Michelangelo" (p. 236). Although the five of them which have been published so far are by four different hands, they are all given to the more than hypothetical Antonio Mini. For most of them this is too late.

The author attempts to reconstruct the lost *Giovannino* from a drawing in the Louvre (Berenson 1588, Frey 63, fig. 110) which he dates correctly *ca* 1505/6. As the statue was made about 1495/6, the drawing is tentatively interpreted as a memory sketch of the earlier work. We do not believe that this complicated movement was possible in an isolated statue in 1495 soon after Michelangelo's return from Bologna or even some time after his return from Rome. The only instance that could be cited is the satyr of the *Bacchus*; but this is an auxiliary motif emphasizing the severe relief of the principal figure. Furthermore, the motif is developed strictly within the plane in contrast to the column-like treatment of the figure in the drawing. This putto is almost a copy in reverse of the Child in the Bruges *Madonna*, one of many proofs that the latter is dated too early in 1501. How could the *Madonna* have been conceived at the same time as and even "just before" the marble *David* (p. 158)! The dynamic force of the group surging toward the figure of the Child is in strong opposition to the placid unfolding of the relief plane in the *David* or the *Pietà*, which is also mentioned by the author in this connection. The movement of the Child around a central axis is indicative of the phase of development reached in the *Bathers* (1504/5); by the same standard the Doni tondo, which the author dates in the summer of 1506, is slightly less developed than the Bruges *Madonna*. Now the tondo is undoubtedly a *quadro da sposa* and the date of the Doni-Strozzi marriage, end of 1503 or early 1504, coincides exactly with the date we would assign to the panel on stylistic grounds. The Bargello tondo, so closely related to the Bruges *Madonna* in various respects, should not be separated by three to four years from the latter; it does not precede but follows the London tondo. In the latter a mere juxtaposition of figures on a level plane allows for a smooth adaptation of their outlines to the shape of the panel, while the new principle of curved planes surging toward the center is more fully realized in the Bargello tondo than in any other work of this period.

It is to be regretted that by his arbitrary datings the author confuses the clear line of development that can be traced throughout these, the most important formative years of Michelangelo's career. The author's dubious expedient of describing certain important drawings as "memory sketches" makes it possible for him to expand the interval between a drawing and a corresponding piece of sculpture and to reverse their relationship *ad libitum*. With such methods no serious writing of history is possible.[13]

To strengthen his surprising theory that the putto in the Louvre drawing (Frey 63) is a memory sketch of the lost *Giovannino* the author quotes as further copies a drawing which he ascribes to Bandinelli, two statues by Pietro Bernini and some

8. For a full discussion of the marble *Hercules* the reader is again referred to the present writer's forthcoming paper.

9. Jacob Hess, "Michelangelo and Cordieri," *Burlington Magazine*, LXXXII, 1943, p. 55. The pope and the bishop are unfinished, especially in the faces. Decorative details of tiara and mitre are left to an assistant. Another (or is it the same?) assistant has completely spoilt the apostle with the book by giving it an unpleasantly smooth and overdetailed finish. It is no credit to writers on Michelangelo that none of them, not even Wölfflin, has recognized the fourth statue for what it is: a close paraphrase of Donatello's *St. Mark*. This figure which, needless to say, was not touched by Michelangelo's chisel, proves even more convincingly than the others with what haste the sculptor tried to fulfill the conditions of the contract. Yet it has not the faintest resemblance to Baccio da Montelupo's style.

10. That the "Cardinal of Siena" is mentioned in the letter and not his heirs (p. 229) proves nothing. Michelangelo's father was not a lawyer; and besides, "Cardinal of Siena" was the wrong title for Pius III, even in 1504.

11. *Burlington Magazine*, LII, 1928, pp. 300 f.

12. *Burlington Magazine*, LXVI, 1935, p. 72.

13. The sketch for the Bruges *Madonna* in the British Museum (Frey 45, Berenson 1479 r.) is on the same sheet and contemporary with figures strongly related to the cartoon and probably intended for it. The close connection between the statue and the cartoon, which we assumed above on stylistic grounds, is thus confirmed by documentary evidence.

other works.[14] No student of classical archaeology, a discipline that has developed the tracing of prototypes into a science, would admit that the figures by "Bandinelli" and Bernini with their utterly different stance and proportion could be derived from the same model or that the putto in the Michelangelo drawing could be a copy (in reverse!!) of that model. "Bandinelli's" St. John is a youth; the two Bernini figures are bearded men; thus not even the "Bandinelli" figure could be an echo of Michelangelo's *Giovannino* if the chubby child in the Michelangelo drawing should correspond at least in age to the lost statue. Besides, like the two Bernini statues and the Michelangelo drawing itself, it shows a complicated movement which we cannot believe possible at the early date of the lost statue.[15]

We know so little about this and other lost works, like the bronze statue of Julius II, that the only policy open to prudent and methodical scholarship is frankly to avow our complete ignorance. We believe we know somewhat more about the *Battle of Cascina*. Here the discussion has centered around the question whether or not the grisaille in Holkham Hall reproduces the entire composition. Justi,[16] Popp[17] and the author (p. 214) believe it does, although Koehler[18] would add four more figures at the left which appear in a poor and inexact copy of the cartoon in the Uffizi of the middle of the sixteenth century. It is certainly true that the open outline of the group at the left of the grisaille demands a continuation and that the hideous rocks closing the gap seem an unsatisfactory invention by the copyist, who was working at a time when part of the cartoon had already been lost. We have an original sketch by Michelangelo (Berenson 1418, Frey 26, fig. 112) for one of the four additional figures. The fact that it is inspired by an ancient sarcophagus[19] is used by the author as an argument against the inclusion in the cartoon of the four figures. This is certainly not sound logic.

In the *Vita* of Cronaca[20] Vasari describes the Sala del Consiglio (for which both Michelangelo's and Leonardo's battle pieces were intended) as it appeared around 1500, before Vasari himself remodeled it completely, raising its height 12 braccia. The two side walls facing north and south contained each three windows surmounted by oculi; they did not offer sufficient space for paintings. The east wall had a length of about 106 braccia (*ca.* 61½ meters!) with two windows in the center. The west wall, measuring 90 br. (52¼ meters),[21] had four windows. These dimensions seemed to Koehler sufficient reason for the assumption that the west wall was unsuited for fresco decoration, and the author follows him in this argument. According to Koehler, both Michelangelo's and Leonardo's frescoes were to be painted on the east wall, separated by the two windows in the center. M. de Tolnay assumes that Leonardo's battle for the standard occupied the central position between the windows, with another Leonardo composition on the right, and that the remaining part of the wall to the left was assigned to Michelangelo. This we believe to be out of the question. It would mean that Michelangelo condescended to play second fiddle to Leonardo to the extent that he "set the central group [of his composition] slightly to the right . . . to guide the eye of the spectator . . . in the direction of . . . Leonardo's Battle for the Flag" (p. 108). It would mean that Michelangelo was given one third of a tripartite composition to paint, which is in contradiction to his own statement[22] that half of the room was turned over to him. It was Sir Kenneth Clark who pointed out[23] that the *Battle of Anghiari* may well have been a triptych with the battle for the standard separated by windows from a group of wild galloping horses on one side and a cavalcade on the other, both of course by Leonardo. In that case the space assigned to Michelangelo would have been on the opposite wall, and we have Vasari's and Varchi's word for that. The four windows on the west wall offer no serious objection. It is clear from Vasari's description that, like the two on the opposite wall, they were added as an afterthought, because the hall was too dark. They would scarcely have been placed at a level which would disturb the frescoes, as the author assumes. Firstly, they were much more effective when placed high, immediately under the ceiling just as Vasari placed them when he remodeled the room. Secondly, it is probable that not only the ends, but even the center of each wall, had lower rooms adjacent to it, so that the windows could be arranged only as a kind of clerestory. Such an arrangement of the windows would scarcely have been open to any aesthetic criticism: placed high and in the center of their walls, they were sufficiently far away from the windows of the south and north wall to make it unnecessary to align them on the same level with those. Even if the window zone should have had the very considerable height of 7 braccia, beneath it there must have been available for paintings, another strip of at least 7 braccia out of a total height of 20. Since, at least in theory, the entire width of the wall could have been used for paintings it is possible neither to say for which of the two walls Michelangelo's fresco was intended, nor to draw from its position on the wall any conclusions as to the completeness of the Holkham Hall grisaille. There would have been ample room for the groups of horsemen mentioned by Vasari and Varchi, or even for an entire second fresco.

In discussing Michelangelo's studies for the cartoon the author's criticism seems unnecessarily severe. It may be true that Frey 62, Berenson 1604 v. (here p. 189 and fig. 120) has suffered great damage, but the authenticity of the recto (Frey 61, Berenson 1604, fig. 122), which is in fairly good condition despite some later additions, should not have been questioned. The wonderful drawing in London (Frey 103, Berenson 1476, fig. 121) may have been ruthlessly retouched, but, as Frey points out in a detailed description, the original lines can well be distinguished from the later "corrections." The author calls it a copy, and he is inclined to think the same of the drawing in Oxford (Frey 202, Berenson 1559, fig. 119). This is undoubtedly authentic, although the sketch of the same motif in the Casa Buonarroti (Berenson 1656, fig. 117), which the author claims as an original, is a poor copy from the second quarter of the century.

None of these statements is founded on careful descriptions of the condition of the drawings such as distinguish Frey's catalogue. Similarly, in the *Catalogue of Original Sculpture and Painting*, we miss the precision of Thode's descriptions. It is, for instance, essential to state not only, as the author does, that the right hand of the Bacchus was broken off at the wrist, but that the hand itself was fractured, because this is an important argument against a recent opinion that the hand is the work of a restorer. The edges of the marble tondo in London are described by the author as being broken in two places. These irregu-

14. It is inconceivable why the statue wrongly ascribed to Tiziano Aspetti in the Kansas City Museum is included in this list. It differs in every single motif from all the others.

15. It is difficult to follow the author in his hazardous speculations on the presumable state of preservation of the lost statue (p. 199). In quoting a ms. in the Bibliothèque de l'Arsénal which mentions "a famous head of St. John by Michelangelo in the cabinet of Girardon" he naïvely assumes this to be the head of the *Giovannino* and concludes that the statue if ever found would prove to be headless.

16. *M. A. Neue Beiträge*, Berlin, 1909, p. 151.

17. *Leonardo Zeichnungen*, Munich, 1928, p. 48.

18. "Michelangelos Schlachtkarton," *Kunstgeschichtl. Jahrbuch der K. K. Zentralkommission*, I, 1907, p. 148.

19. As pointed out by J. Wilde, "Eine Studie Michelangelos nach der Antike," *Mitteilungen des Kunsthist. Instituts in Florenz*, IV, 1932, p. 41.

20. Vasari-Milanesi, IV, p. 448.

21. The author is mistaken in giving "the length of each lateral wall" as 106 braccia (p. 216). The width of the hall is not 12.17 meters, as he states p. 106, confusing it with the height, but 22.

22. In the letter to Fattucci of 1524, Milanesi, *Lettere di Michelangelo Buonarroti*, Florence, 1875, p. 426.

23. *Op. cit.*, p. 138.

larities are not damages caused by accidents, but they seem to indicate a change in Michelangelo's plans.

We read in the introduction to this book that "past research on Michelangelo done by the author is summarized in the critical catalogue." In his *Kritische Untersuchungen* Thode so well traced the history of the various pieces, and the ramification of copies etc., that the corresponding parts of the author's *Catalogue* often read like a literal translation of Thode. We regret this duplication of effort. It might have been different if his catalogue could supersede the work of Thode, Frey and Berenson. But as the student will still have to turn to the information given by these scholars it would have been more advisable to limit the critical apparatus to a well documented correction of misattributions and other errors. Such a procedure would have made it possible to avoid the continuous repetition in this part of the book of the entire material already discussed in the two preceding sections.[24] Thus under the heading: "Subject" the *Catalogue of Original Painting and Sculpture* re-discusses the iconographic problems of every single work, drifting from iconography to interpretations which are sometimes very subjective, contrary to the objective nature of a catalogue.

The rigid pattern of the catalogue further provides for each piece a paragraph labelled "Analogies." Here, as in the text, the author reveals his unfamiliarity with the works he is comparing to Michelangelo's. We quote a few examples. The crucifix in Impruneta is described (pp. 80 and 197) as the work of Giambologna. However, it is cast from the same model as the cross in S. Trinità, a documented work by Felice Palma, pupil of Tiziano Aspetti. Modelled after Giambologna's death, it differs from his work as much as the Baroque differs from Mannerism. Pietro Tacca is said (pp. 80 and 278) to have collaborated with Cellini on the Escorial crucifix, a surprising achievement in view of the fact that he was born several years after Cellini's death. The "Bacchus in the Bargello by Andrea Sansovino" (pp. 144 and 277) might be a mere *lapsus calami* for Jacopo Sansovino, but the same line mentions a *Bacchus* by Jacopo Sansovino in the National Gallery at Washington which unfortunately is a late seventeenth century Italian or eighteenth century French work. Neither should the mediocre statue of St. Anthony of Padua in S. Petronio in Bologna be given to Jacopo Sansovino (p. 171); the attribution does not occur before the late seventeenth century, and it is not upheld by any serious student of the master.[25] On p. 58 we read that "the equestrian monument of Gattamelata by Donatello is also his tomb." The tomb of the Gattamelata is inside the church of Sant'Antonio in Padua and known to every student of Venetian sculpture. The child in Desiderio's Madonna relief in the Victoria and Albert Museum is *not* "most probably a copy after Leonardo's pen drawing in the British Museum for the Benois madonna" (p. 130), since this reversion of chronology is based on Liphart's attribution of some of the finest reliefs by Desiderio to Francesco Ferrucci, a theory never accepted by a serious scholar. Vettorio di Buonacorso Ghiberti did not execute the cornice of the bronze portal by Andrea Pisano (p. 244), but his grandfather Vittorio di Lorenzo forty years before the grandson was born in 1501. The crosshatching of Michelangelo's earliest drawings is traced back to Ghirlandaio's technique (p. 67)[26]; but why illustrate this connection with a drawing (fig. 75) definitely not by Ghirlandaio?[27]

An appendix of documents promises much unpublished material gleaned from the Archivio Buonarroti, but the yield is disappointing. A section entitled "Concerning Michelangelo's Generosity" contains mainly letters from servants and other dependants seeking monetary aid. That Michelangelo had an open hand for the poor is known from many letters published by Frey and Milanesi, and one is surprised to find so much attention given to the private life of "Michelangelo the Florentine Bourgeois." Among this correspondence also appear some letters from artists asking for drawings. Two from Valerio Belli are introduced (p. 244) as "briefly mentioned without the dates, yet not published, in Gotti, I, p. 145." The author omits saying that the second of these letters, identical in content with the first, was published in facsimile and transcription by C. Pini (*La scrittura di artisti italiani*, 1869–74, II, pl. 136) and again in facsimile and transcription by Steinmann-Wittkower, *Michelangelo Bibliographie* (p. 442 and pl. VI).[28] As none of this correspondence is dated before 1520 one is surprised to find it in this and not in one of the later volumes.

Another section called "Influence of the Clergy on Michelangelo's Spiritual Views" draws far too hasty conclusions from three unpublished letters. (One of these, already published in its more interesting part by Frey, is from the abbot of Pietrasanta, but expresses no spiritual views.) A letter of 1516 from a Roman friar named Lorenzo begins, "I see from your letter that you have embraced salvation," and then goes on to discuss the love of God in Augustinian terms familiar to every educated cleric or layman of the time. It is impossible to conclude from this *one* emotionally overwrought letter that Fra Lorenzo "inspired the conception of spiritual love as found later in Michelangelo's poems" (p. 251).

The other letter is very different in character. A Fra Lorenzo Viviani writes Michelangelo from Bologna in 1508 that he and his merry company consoled themselves after Michelangelo's departure with two pheasants and goes on to say, "I believe that our prayers and fasts [!] and vigils must have been of great help to you." This is, of course, a joke; yet the author draws (pp. 39 and 251) the most serious conclusions from it. The merry friar's very trivial remarks about the mutability of man's fortunes are interpreted as reflecting the contrast between the mediaeval and the Renaissance conceptions of Destiny!

The historian should sense the inflections, the hidden humor and the innuendoes of his text, and of course he should understand its language. In discussing Michelangelo's famous letter to Benedetto Varchi (Milanesi, *Lettere*, 522) the author never mentions the sarcastic tone which is so important a clue to its interpretation. He translates (p. 115): "I conceive sculpture to be that which is made by bringing forth [!!] — per forza di levare (that is, in contrast to the technique of painting which is done by the process of addition, per via di porre)." This makes no sense at all. Correctly translated the famous passage reads: "When I say sculpture I am thinking of the kind produced by *taking away*; the other kind that is made by adding is similar to

24. The entire book is encumbered by the inclusion of irrelevant material. Illustrations like those of the interior of Santo Spirito (fig. 151) and of the Medici Garden (fig. 198a) add nothing to our knowledge, and an erudite reference like the one to Betussi's translation of Boccaccio's *Genealogia degli Dei* (p. 134) is positively misleading, as the book was published in the year of Michelangelo's death.

25. Weihrauch, *Studien zum bildnerischen Werk des Jacopo Sansovino*, Strasbourg, 1935, p. 7.

26. It should be noted, however, that Michelangelo carries the crosshatching much further than Ghirlandaio, so that his surfaces sometimes resemble those of Northern engravings: and one wonders whether this could be due to Michelangelo's acquaintance with Schongauer's engraving of *St. Anthony*?

27. Though much less important, it is disturbing to read that a part of the cartoon was preserved in the Villa del Vecchietto near Florence (p. 212) (an expression taken over from Borghini, whose contemporaries knew, as the modern reader does not, that he meant the villa of Bernardo Vecchietti) or to find fifteenth century engravings constantly referred to as "etchings" (pp. 69, 92, 218).

28. The author likewise introduces as unpublished a drawing by Dosio (p. 216) reproduced in Lensi, *Il Palazzo Vecchio*, Milan and Rome, 1929, p. 237. One is also surprised to find as "unnoticed" (p. 227) a drawing by Giuliano da Sangallo, in the Taccuino Senese, which has the inscription: "di mano di marina lorenzo sanese." This drawing and similar ones by Antonio are well known as copies of the Piccolomini altar. Incidentally, the taccuino is described, p. 55, note 96, as by Antonio da Sangallo. Furthermore, students of Renaissance architecture will be amused by the characterization of Giuliano as "a mediocre artist" (p. 48, note 30).

painting." Needless to say, the second half of the sentence is not a definition of painting; it is a gibe at a kind of sculpture maliciously compared with painting because painting is inferior to sculpture, as the same letter maintains, despite ironical statements to the contrary.

The same heavy-handed methods are employed in the interpretation of works of art. In the introduction the author says with pardonable overstatement, "The great critics of the past have analyzed style and form in Michelangelo as if they had an existence separate from the content. More recent writers have interpreted the subject matter as if the works were simple illustrations of intellectual abstractions." Instead he makes the laudable promise "to show in them the mutual dependence of form and content."

But has this noble intention been realized in the actual discussion? "Michelangelo chose *rilievo schiacciato*, very flat relief as the technique best suited to expressing this highly spiritual ideal [of the *Madonna on the Stairs*]" (p. 76). We are told that technique and content are related; that technique expresses content. And what content? "Woman as both creator of life and keeper of death. Michelangelo has integrated the Christian Mother of God with the Demetrian principle of woman"! We are not told *why* this particular technique expresses this particular content better than any other, and we are not told anything about *form* as a symbolic function in its own right transcending and transforming content. (Incidentally the author in comparing Michelangelo's *schiacciato* to Donatello's is mistaken in thinking that Donatello used this technique only "in a pictorial spirit" or that Michelangelo did something new in preserving the surface of the block. That is exactly what Donatello had done.)

In the *Battle of the Centaurs*, as in the *Battle of Cascina* and in the *Last Judgment* is found (p. 78) a "whirling movement expressing the fateful life-stream." In the *St. Matthew* "the ebb and flow of vital forces" is suggested (p. 113). This vitalistic theory which we have already encountered in the "Demetrian principle of woman," assumes a Freudian character in such phrases as: "The Herculean form of the Child [in the *Madonna on the Stairs*] emerges from the cloth as though from the womb of his mother" (p. 75) or: "This extraordinary disposition of the Child [of the Bruges *Madonna*] between the knees of the Virgin suggests his being in the maternal womb . . . he is depicted as about to disengage himself from the protective womb and to descend into life" (p. 99).

It is difficult to understand how this "vitalism" can be reconciled with the "pure idea of existence" which the author finds embodied in the "Platonic" art of Michelangelo (p. 118). To the Platonists of the Renaissance life seemed to move in spheres infinitely below the realm of ideas or pure forms and we doubt that Michelangelo would have approved the descriptions of his works quoted above. "The formal motif or the subject matter," the author explains in the introduction, "is only a point of departure; during the execution of the work the artist . . . infuses into it his experience of life in order to create an image of existence which reveals to us a fundamental law of life." And what is a fundamental law of life? In the *Bacchus* great importance is attributed (p. 143) to "the distribution of the three heads in a spiral which suggest three different stages of life, i.e., death — as the lion's [! the skin worn by Bacchus is not that of a lion] mask, the renewal of life — as the satyr's face, and the decline of life — as the Bacchus." The *Bacchus* is "the human incarnation of the life cycle of nature" (p. 90). If that is "a fundamental law of life" it appears to us to be an exceedingly trivial one. We would describe this method as an allegorical interpretation of content and not as an "attempt to show the mutual dependence of form and content." To the author "form" is the "formal motif," a "point of departure" which is absorbed in the allegorical interpretation of content; to Michelangelo it was the supreme goal of art, penetrating content and raising it beyond the struggle of life.

This, then, seems to be the author's last word on Michelangelo. We pause here to remind ourselves that no book can ever hope to capture the whole of Michelangelo's genius. If the writings of the past bear the unmistakable mark of their time, shall we consider this book as representative of our own time? Certainly not, so far as its accidental shortcomings are concerned, the appalling inaccuracy of its factual statements and the insufficient familiarity with the material.

Must we then regard the ahistorical attitude that appears in its misuse of dialectics and in its primitive philosophy as typical of our time? If Grimm and Thode were time-bound, the reason is to be found in a spontaneous reaction toward art shared by their contemporaries and differing from our own. It affected their style of thinking rather than the matter of their thought. The author of this book is not a victim of such naïve and subconscious delusions. In basing his construction on the unstable foundations of bits of philosophy snatched from here and there, he has allowed a cold and blind abstraction to penetrate the very substance of his argument. The terminologies of Plato and Plotinus, Hegel, and almost as much those of Bergson and Freud are dangerous things to play with even on their own grounds where alone they have full significance. Transplanted literally into regions for which they never were intended, these concepts become ugly and gross materializations of their purer and nobler selves. When such concepts conflict with each other and are as anachronistically modern as they are trivial, then we remember that too often the modern critic sees in the deep well of the past only his own reflection.

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FISKE KIMBALL, *The Creation of the Rococo*, Philadelphia, Philadelphia Museum of Art, 1943. Pp. XVII + 242; 274 pls. $12.00.

The publication of Fiske Kimball's *Creation of the Rococo* was expected with interest by those who have followed the author's significant contributions to the art history of the seventeenth and eighteenth centuries. A pioneer in many fields of American and European art literature, Mr. Kimball has during recent years devoted his scholarship and his remarkable capacity for analysis more and more to the problems in the large and fascinating chapter of the art of the Rococo. The result of his studies, presented in an impressive volume, assures the author a rank among those art historians whose contributions become standard works in the field.

In the future anyone dealing with the art of the eighteenth century, or with the art of decoration in general, will have to refer to Fiske Kimball's observations, interpretations, and deductions. That period, neglected by American even more than by European art historians, has now found its congenial representative. Where formerly emotional, superficial, and often second hand interpretations were common — some valuable exceptions notwithstanding — a presentation is given here which is based on careful research, wide range of correlated material, clear coördination of historical and artistic monuments, and sympathetic appreciation.

For those who share with Mr. Kimball the interest in the art of the eighteenth century, the progress of his studies was "on record." With his "Burlington Architectus" in the *Journal of the Royal Institute of British Architects* (1927) he gave the first notice of a new evaluation of facts and works. He continued along these lines through the following years: "The Creation of the Style Louis XV" (ART BULLETIN, XXIII, 1941, pp. 1–15) and "Sources and Evolution of the Arabesque of Berain" (ART BULLETIN, XXIII, 1941, pp. 307–316) were significant achieve-

ments on the road to establishing "more precisely the origin and development of that phase of decorative art, which, emerging in France about 1700 and characteristic of the reign of Louis XV, dominated Europe until the advent of classicism in the latter years of the century." A first comprehensive report of the result of Mr. Kimball's research was presented by him to the International Congress of the History of Art in London, 1939 (published in the *Journal of the Warburg and Courtauld Institutes*, IV, 1940–41, pp. 119–123). Many of the facts presented and ideas developed in those articles will be found in the *Creation of the Rococo*. Arousing interest when published first, they have actually increased in range and importance when reprinted in their wider relations in the present volume.

The student's confidence in the author's methods is easily secured by Mr. Kimball's initial procedure in giving not only a survey of the development and change in usage of the term "Rococo," but in defining clearly and with much historical and philological evidence a nomenclature for his work. His familiarity with the contemporary literature on art and aesthetics is intimate; his investigation of the collections of drawings, particularly of the Bâtiments du Roi in the Archives Nationales, exhaustive. In addition to that, the drawings and papers in the Bibliothèque de l'Institut, in the Cabinet des Dessins of the Louvre and in numerous other places were scrutinized. Studies in archives were carried through purposefully and, above all, the many monuments were fully explored. The whole results in a new view of the background, the genesis, and the evolution of the "Rococo" style.

The first chapter of the book fixes the background. A study of the infiltration of Italian High-Baroque elements into France is undertaken with the intention of proving that these elements — contrary to general opinion — did not create the Rococo. These elements were domesticated in France before the genesis of the Rococo. The Italian influence, it is true, was strong under the minority and early personal reign of Louis XIV. Stefano della Bella and Romanelli were working in Paris; Le Brun, Puget, Girardon, Mignard returned from Rome, where they were impressed by the work of Pietro da Cortona and his High-Baroque contemporaries. However, this meeting of Italian High-Baroque and French artists did not result in the Rococo. The visit of Bernini to Paris in 1665 rather terminated the Italian influence and awakened French artistic originality. The reaction against Baroque forms is traced by Kimball to the Academy of Painting and Sculpture in Rome (founded in 1648) and the Academy of Architecture in Paris (founded in 1671). Colbert's and Mazarin's rôles in the architectural and decorative projects, the working relation between the *Surintendant des Bâtiments* and the *Premier Architecte* enter as essential factors in Mr. Kimball's presentation of the development toward the Rococo. The trends in the treatment of the interior in France prior to 1678 are shown in woodpanelling, use of marble, mirrors, forms of doors and chimneys, ceilings and floors; and the three main motifs of ornament, the cartouche, the trophy, and the arabesque, are given extended discussion. Among these the arabesque was to become of major importance for future decoration; showing bandwork and foliage it can be found in French embroideries and garden designs prior to Le Brun. From his painted arabesques Jean Berain derived and transformed the ornament that became his characteristic contribution: scrolls joined by short straight bars, and volutes "reënforced by a divergent swirl of acanthus." In Berain's ornament — he was never in Italy — Kimball sees the original creative impulse that led to the Rococo.

The second chapter deals with the genesis of the Rococo. In 1699 Pierre Lepautre succeeded Lassurance as *Dessinateur* in the *Bâtiments*. The first evidence of the Rococo is manifest in the designs for Marly, in which Lepautre transformed the painted ornaments of Berain — which were strictly within the geometric outline of the panel — from the plane into relief, from the panel to the frame. Mr. Kimball stresses with good reason the fact that spatial impulses did not create the Rococo, but that the development happened within existing walls of noncomplicated, clear forms. In agreement with this observation, I find the Rococo in its southern German and Austrian variations resulted primarily from, and was directed toward spatial impulses. There the Rococo ornament was found mostly in contemporary architecture and not within already "existing walls." It was not applied to changing the interior of older architectural situations, but was part of a "total" planning, interrelated with the illusionistic ceiling frescoes of palaces and churches. It was directed toward an optical enlargement of the architecture, whose tendency was dynamic and full of "spatial impulses." A. E. Brinckmann, in his *Barockskulptur* (Berlin-Neubabelsberg, 1919) oversimplifies this fact by stating "Deutsches Rokoko ist Totalität" (p. 404), and Rococo in Germany is to him "unlösbare Einheit der gesamten künstlerischen Erscheinungswelt." Adolf Feulner's *Bayrisches Rokoko* (Munich, 1923), a book in which opinions are based more on an evaluation of Bavarian art than on wider comparisons, goes as far as to say: "Zum räumlichen Organismus, zur abstrakten Verkörperung des räumlichen Gedankens hat sich das Ornament erst in der deutschen Kunst entwickelt" (pp. 57–58). It is true, however, that the contribution of artists, like the Asams and Zimmermanns — architects, ornamentalists, fresco painters, and sculptors — is an example of the simultaneous growth of architectural intentions and ornament. It is further safe to interpret the acceptance of the Rococo in the contemporary architecture of Bavaria and Austria as largely owing to the possibilities of spatial expression inherent in it. By following Lepautre's development Fiske Kimball succeeds in presenting the artist as the inspirer of the evolution of the Rococo. Though Germain Boffrand has always been considered the main initiator, this high credit will no longer be justified. Lepautre, without doubt, was the outstanding designer, and he influenced Boffrand as he influenced many others.

Although the years between 1699 and 1715 were decisive for the genesis of the Rococo, the reign of Louis XV was a time of evolution. Three main periods are distinguished in the third chapter of the book: 1. The *style régence*, significant for the Regency of Philippe d'Orléans (1715–23), and until 1730. The leading creative designers were Gilles-Maria Oppenord and François-Antoine Vassé, who were equally influential. In the work of both a change from geometrical lines to flowing curves and an increase of sculptural and figural motifs took place. 2. With the death of Robert de Cotte (1735), and Vassé (1736), and with the decline of Oppenord's importance, a second period of Louis XV art began, the *genre pittoresque*. This phase was initiated by Nicolas Pineau, the sculptor, after his return from Russia (after 1727). Among the numerous revaluations of well known artists in Mr. Kimball's book (Lepautre and Vassé are brought into prominence; Robert de Cotte emerges as a man of little artistic initiative in ornament, but as a repeater of forms created by Lepautre and developed by Vassé), the place given to Pineau is of the greatest significance, for it reflects on the part played by Juste-Aurèle Meisonnier in the *genre pittoresque*. In spite of similarities of his work with the early Rococo (with the scroll and the palmette as motifs), his design was essentially new. He is to be given credit for developing the asymmetrical ornament, yet he was not the first to apply it to the design of interiors; Pineau had already executed works in Paris in the *style pittoresque*. 3. The third phase of the Louis XV style started after the middle of the century. A reaction set in in which the Marquis de Marigny, *Directeur des Bâtiments* after 1751, the Abbé Leblanc, and the architect Jacques-Germain Soufflot were among the leaders of the movement. In the work of Ange-Jacques Gabriel and Jacques Verberckt the movement continued in a conservative way. In 1762, however, a sharp break occurred. Gabriel's work at the Petit

Trianon shows the new wave of influence of English Palladian models. And with the acceptance of the English classical revivalism of Robert Adam, which took place in France about 1770, the Rococo was brought to an end. Contrary to the rise of the Rococo from the interior and its gradual application to the exterior, the classical tendency appeared first on the exterior and penetrated into the interior.

It is hardly possible to realize the number of details that Mr. Kimball has found and presented as important sources for his conclusions. In more than 750 footnotes the author proves each step in his contentions. Only the careful reader of the book will be aware of its important contributions to the history of the art of the eighteenth century. We mention only a few: the analysis of Berain's work for the Dauphin in Meudon (pp. 64–66); the convincing attribution of designs of the Hôtel de Soubise — engraved in Mariette's *Architecture françoise* — to Pineau (p. 168); and especially the publication of the elevations of the exterior of the Petit Trianon by Gabriel (figs. 270–271). The evaluation of the parts played by Madame de Maintenon and particularly by Madame de Pompadour, not as "originators" but as patrons of their contemporary styles, is of importance for the political historian as well as for the art historian. For the first time an attempt has been made to outline convincingly the tasks and spheres of influence of the *surintendant*, the architect, the designer, and the patron. The *dessinateurs* evidently made the decisive creative contributions to the development of the Rococo.

In an epilogue Fiske Kimball discusses the adoption of the Rococo by other European countries. He acknowledges the national character of the style in Germany, Italy, Spain, England, and Russia, and stresses the fact that the "foreign work missed the essential character of its models while gaining, happily, a different character of its own. . . ." Here arises the question whether the genesis of the Rococo in those countries should not be understood as similar to the genesis of the French Rococo; i.e., as a fusion of domestic trends and foreign influences, resulting in a style *sui generis*. Adolf Feulner (*op. cit.*) considers the Bavarian Rococo not only as the "Verarbeitung des internationalen Stiles zu einem deutschen Stil," but explains it as "ein Anknüpfen an die Fäden der seit den Tagen der Gotik ununterbrochenen Tradition" (p. 4). He sees the Bavarian Rococo developing out of native sources and influences of the Roman Baroque, a concept that leads him to deny the French influences, even in the work of Joseph Effner and François de Cuvilliés. Since he understands the Rococo as a late Baroque period, he comes to the conclusion (referring to the late Gothic and the Rococo): "Man könnte von einer psychischen Disposition des Stammes für die Spätstile sprechen" (p. 137). In his desire to present Bavarian Rococo as an original art, Feulner not only denies the influence of French Rococo but also speaks of a parallelism in time, in which the German characteristics are the determining factors. The German Knorpelwerk ornament of the seventeenth century is a main source of the Bavarian Rococo in Feulner's presentation, and he anticipates the theories of recent German art literature by the statement that the Rococo in France would not have been possible if Watteau, Oppenord, Gillot, Audron and Slotz had not had Netherlandish (i.e., German) blood. In my own *Matthäus Günther, Die Freskomalerei im süddeutschen Kirchenbau des 18. Jahrhunderts* (Augsburg, 1930) I took exception to the overemphasis on local derivations and traced the waves of influence to which the German artists were exposed or exposed themselves. Kimball's book will be of further help in clearing up these questions. In other countries similar attempts to trace the origin of the local Rococo style have been made. The *Creation of the Rococo* is the most stimulating challenge presented to the student in this field; a challenge to consider, and reconsider, and which will force a revision of many conclusions now made questionable.

The work was out of print only a few months after its appearance. Its second printing should contain marginal glosses or sub-captions. Thus readers not very familiar with the subject may find their way with greater ease through a wealth of material and ideas that should become part of the education of the art historian.

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MITCHELL A. WILDER WITH EDGAR BREITENBACH, *Santos — The Religious Folk Art of New Mexico*, Colorado Springs, The Taylor Museum, 1943. Pp. 49; 64 pls. $4.00.

EDGAR L. HEWETT AND REGINALD G. FISHER, *Mission Monuments of New Mexico*, The University of New Mexico, 1943. Pp. 269; 54 ill. $4.00.

When the Spaniards went north from Mexico in 1598, they hoped to gain another rich colony. But instead of gold and great nations such as they had found in Mexico and Peru, they met a hostile population in a land without treasure. The colony of New Mexico, which preceded any Anglo-American settlement in what is now the United States, became important mostly to the priests as a source of converts. From the beginning it was the Franciscans, not the military, who were content to stay. They taught the natives to construct churches and religious furnishings, and this work, far more simplified than the contemporaneous art and architecture of urban centers in Spanish America, has in recent years been the source of several serious studies.[1]

In *Santos* Mitchell Wilder and Edgar Breitenbach have presented the first extensive study of the Spanish American religious sculpture of New Mexico, including ten examples of painting (*retablos*).[2] This is a noteworthy contribution: scholarly, well-composed and superbly illustrated, befitting the fine collection of the Taylor Museum of which it is a catalogue. *Santos* and the Taylor Museum traveling exhibition which it accompanies should serve to create a wide enthusiasm for the religious folk art of the Southwest. Previously, exhibitions at the Brooklyn Museum and Worcester Art Museum,[3] together with a few popular articles, did much to stimulate interest in an art which has been dead since 1900. The thorough work, however, of supplying an iconographic guide has been done by Wilder and Breitenbach. Theirs was the task of identifying the *santos*,[4] without the assistance of signatures or original records. As they make clear, European iconography does not always prove helpful because the native workman might create his own variations of an Old World theme, often giving the saints new attributes. Furthermore, several saints are indigenous to America and therefore no European sources can be found. Finally, most of the *bultos* lack specific provenances. In *Santos* the figures are convincingly identified, many of them arranged in four regional groups, and in a number of cases the valid suggestion is made that certain ones may have come from the same maker (*santero*).

Excellent captions accompanying the reproductions give iconographic information and call attention to the aesthetic principles underlying the sculptures, such as naturalism, a "wide range of psychological expressions," and frequently a columnar appearance due to long and smoothly sculptured garments. Unfailingly the authors indicate the salient characteristics of each example,

1. George A. Kubler, *The Religious Architecture of New Mexico*, Colorado Springs, The Taylor Museum, 1940.

2. The *retablos* (paintings on wood) are not treated thoroughly in this publication because the Taylor Museum will publish the work by William S. Stallings, Jr. on this subject after the War.

3. In 1943 the Taylor Museum collection was exhibited at the Museum of Modern Art, Cincinnati Art Museum, Chicago Art Museum, etc. Two earlier exhibitions of *santos* took place in the Brooklyn Museum in 1933 and 1940, and one at the Worcester Art Museum in 1938.

4. Both the sculptures and paintings are called *santos*. The sculptures are also known as *santos de bulto*, or *bultos*. The paintings are generally referred to as *retablos*.

pointing out the most expressive feature of a sculpture or noting the line and proportions.

"The religious folk art of New Mexico was created out of necessity, and as it grew, it became the major artistic expression of generations of colonials" (p. 22). Professional artists and craftsmen were not included among the small number of settlers and administrators who came to the frontier region of New Mexico in the seventeenth century. And the difficulties of transporting supplies by oxcart over the one poor road (*camino real*), as well as the modest community life, curtailed importation of most religious furnishings for churches and homes. Hence, the Franciscan Fathers served as architects, sculptors and painters, teaching the natives these crafts. Most surviving examples were made between 1700 and the middle of the nineteenth century. Many earlier specimens were destroyed in the Indian rebellion of 1680, and most of the published examples were manufactured in the nineteenth century. After the Spanish reconquest in 1692 and "until the infiltration of Anglo-American civilization in the nineteenth century" (p. 41), the images were made by amateur workmen and also by professional *santeros* who traveled from village to village selling their work.

The authors give a clear explanation of the technique of making the *bultos*. These were generally of cottonwood, a soft wood easily carved with a knife, then covered with gesso and colored with local paints. Some, especially those used by the cult of the Penitentes, had articulated joints for dramatic reenactments of the Passion. In other figures realism was achieved by draping gesso-dipped cloth over the carving to represent garments. At this point Wilder and Breitenbach might have found an interesting analogy in similar methods in Guatemala and Mexico. In fact, among the few omissions in this admirable book are the broad comparisons which we need with the art of other colonial areas. Perhaps these will follow in future work covering material in other collections or in related fields.

The student who approaches colonial art by way of American Indian cultures might wish that the authors had paid more attention to the native populations and their arts before the coming of the white man. The student of the *santos*, on the other hand, might ask for a complete bibliography and a full list of collections, since the record is brief at best.[5]

Regarding European sources for the subject matter, Wilder and Breitenbach suggest statues, paintings and prints. They note that until now scarcely any specific Mexican or European sculptures have been found which might have served as models. Another possible set of prototypes, which they do not mention, might have been provided by illuminated manuscripts. Certainly the Franciscans brought with them religious literature, and there are records of books of chants and missals among the shipments from Mexico City in 1631 and other years.[6] Therefore, when the authors give such a specific reference as the *Trinity* in the form of three identical men bound with a chain (pl. 49) having been used in a Flemish manuscript of 1415, perhaps the next step should be to consider the possibility of illustrated religious books as models. Such a version of the *Trinity*, prohibited in Europe during the eighteenth century but continuing in the New World, suggests still another possibility for comparison with the other forms of Latin American religious art. It would be interesting to trace from New Mexico to Argentina the distribution of such popular subjects as the three-man *Trinity*, or the cult of the Christ Child.

5. To the bibliography given by Wilder and Breitenbach should be added other items published before *Santos* was written: Sheldon Cheney and Martha Candler, "Santos, An Enigma of American Native Art," *Parnassus*, VII, 1935, pp. 22–24; Odd S. Halseth, "Saints of the New World," *International Studio*, XCIV, 1929, pp. 32–36, 78. Other collections of both *santos de bulto* and *retablos:* Weyhe Gallery, J. B. Neumann, Herbert J. Spinden, etc.

6. France V. Scholes, "The Supply Service of the New Mexico Missions in the Seventeenth Century," *New Mexico Historical Review*, V, 1930, pp. 93–116.

The authors' treatment of the intimate rôle which saints played in the life of New Mexicans brings to mind similar sympathetic and reciprocal relationships between man and religious images in other parts of the world. Not only did the New Mexican make offerings to the saints but he sometimes punished them if his pleas were not answered. An example is given in the case of San Antonio whose image might be turned to the wall if he did not aid in retrieving a lost article (p. 33). This is reminiscent of disciplinary measures in other regions: in Africa the Negro scolds or beats his fetish; in China a worshipper might fling into the dirt an idol which had not been helpful; in southern Europe, when a drought persisted, the peasants ducked a figure of the Virgin or of St. Peter, and punished several saints in various ways for not bringing rain.[7] All these instances reveal "the worshipper's endowment of the sacred image with a life and personality modeled on his own."[8]

A desire to learn more about the charming folk art of the Southwest has been skillfully engendered by Wilder and Breitenbach. Their book is one of the finest and most sympathetic presentations ever made in the field of Spanish American art.

A publication of a different nature is the handbook by Edgar L. Hewett and Reginald G. Fisher. This survey, intended for the layman rather than the specialist, compiles information from preceding publications. Its purpose is to synthesize in popular fashion the history of the old missions of New Mexico and to explain the projects for their preservation. Dr. Hewett has been prominent in furthering the restoration of the colonial monuments. He is, therefore, in a position to report upon accomplished reconstruction as well as upon future plans. Unfortunately, *Mission Monuments of New Mexico* does not fully satisfy its purpose of giving a clear-cut picture of early post-Conquest architecture in the Southwest.

After a brief chapter on the myth, legend and history of this area, considerable attention is paid to Francis of Assisi and the origins of the Franciscan Order. This long and extremely detailed résumé of the beginning of the Order in Italy during the thirteenth century, concludes with the arrival of the Franciscans in the New World. As we know, the Order exerted a major influence on the development of a Spanish American colony in the Southwest. This portion of the book would have been more vivid if photographs of early paintings and sculptural details were used instead of reproductions of the murals in the St. Francis Auditorium of the Santa Fé Art Museum. So, too, in the later treatment of the architecture, there is a need for at least a map or two and some architectural plans to give more conviction to the drawings of reconstructed buildings.

Important background material appears in a synopsis of the conquest of New Mexico, beginning with the Coronado expedition in 1540 and followed by the Oñate expedition of 1598, which permitted the establishment of the Franciscan friars. Here Hewett and Fisher summarize the historical record concerning the individual priests, their assignments, etc. This section of the book makes clear the disappointment of the conquistadores and the persistent efforts of the clergy. An Indian uprising in 1680, in which there was widespread destruction, closed the first period of Spanish occupation. When New Mexico was reconquered twelve years later, new buildings were erected. These are considered but briefly, since *Mission Monuments of New Mexico* is chiefly concerned with the pre-Rebellion churches of Ácoma, Pecos, Abó, Quarái, Gran Quivira, and Jémez.

The history of each church is given, with remarks upon its location, construction, etc. Much of this material is quoted from earlier sources. In a final chapter ("Reclamation and Rededica-

7. Edward B. Tylor, *Primitive Culture*, 4th ed., London, 1903, II, pp. 144, 170, 171; Sir James George Frazer, *The Golden Bough*, 3rd ed., London, 1913, I, pp. 299–300.

8. Tylor, *ibid.*, p. 171.

tion") emphasis is laid upon the importance of preserving these architectural remains as a record of early colonial days. The condition of the seventeenth-century churches is described, as well as the technique of reconstruction done under the supervision of the School of American Archaeology and Museum of New Mexico with the help of various agencies. Detailed reports of the excavations carried out in connection with restorations are presented.

It is to be regretted that this handbook carries no discussion of the general features of Spanish American architecture in comparable regions. If some indication were given of cultural connections, the reader would become aware of broader horizons and possibilities for further study. New Mexico may have had little contact with regions to the south but it was not a unique area. Certain characteristics are comparable with those of other Latin American countries. For example, the mission churches of the Southwest United States have features in common with those of northwestern Argentina, especially the Andean region known as the Puna Atacameña. There are striking points of similarity in both regions; such as the difficult terrain, the limited materials and manpower, and the presence of non-professional designers. In Argentina the Jesuits, like the Franciscans on the northern frontier, were the originators and supervisors of a simple adobe architecture. Their churches have been clearly recorded in the fully illustrated *Documentos de arte argentino*.[9] We cite a specific case: the Argentine village church of San Bernardo is reminiscent of the New Mexican churches in Santa Cruz, Isleta and Ácoma.[10] It would be interesting also to contrast the interior decoration of missions in these widely separated regions, observing whether the religious furnishings in the sanctuaries of Argentina came from Peru or Spain, or if they were of local manufacture, as in New Mexico.

In a final evaluation of *Mission Monuments of New Mexico*, one might add that a better résumé would have resulted had the authors not quoted complete pages from previous works. A less diffuse volume would have been possible, enhancing the new contribution of the reports on reconstruction.

NATHALIE H. ZIMMERN
Brooklyn Museum

National Academy of Design Exhibition Record, 1826–1860, New York, The New-York Historical Society, 1943. Vol. I, pp. xv + 300; Vol. II, pp. 365. $5.00.

The importance of these volumes can hardly be overestimated, for they are a tool of the most fundamental kind. Their effect on scholarship in American art will be like a blood transfusion; even the most distant limbs of research will be strengthened and revivified.

The book is a codification of the catalogues of the National Academy of Design during its first thirty-five years. The pictures, sculptures, and prints that were exhibited are listed alphabetically under the name of the artist. The title of each work is given, along with its date of exhibition and such facts as to ownership as the original catalogues contain. The birth and death dates of the artists are appended whenever they could be ascertained, and their addresses whenever these were printed in the catalogues. If they were members of the Academy, the period of their membership is stated. An excellent index, which itself covers 130 pages, cross-references items in many ways: according to title of exhibit, name of portrait subject, name of owner, addresses of artists by localities, and such general classifications of subjects as seemed feasible: i.e., "Maine, views in," or "Irving, Washington, works of, illus."

The index is an itemized summary of the catalogues, and from it much interesting statistical information can be gleaned. We can, for instance, compare the number of times the writings of different authors were illustrated in paintings exhibited at the Academy; since a literary approach was so common among the artists of the period, this may give us an insight into the state of taste. The Bible, of course, is used most often, seventy-three pieces being listed under that heading alone, without counting more specific headings like "Holy Family" or "Magdalen." America's Protestantism is reflected by the inclusion of thirty-one paintings of Christ to nine of the Virgin. After the Bible in popularity comes a most revealing tie: Shakespeare and Washington Irving are both included thirty-four times. Fourth and fifth place are also tied: Walter Scott and William Cullen Bryant get twelve mentions each. We need not be surprised to find Cooper next with eight canvasses. Then come Cervantes, seven; Dickens, four; Milton and Longfellow both three; and Samuel Butler, Thomas More, and Edmund Spenser, two. Most interesting is the fact that scenes from Hawthorne and from Poe are among those painted only once, while there is not a single illustration from Whittier, or from Thackeray. (Incidentally, this exploration revealed an error of the type that cannot help creeping into so vast an index: one of the paintings listed under "Miles Standish" is not included under "Longfellow.")

The figures we have quoted cannot be taken at their face value; extraneous considerations that modified the result will occur at once to any scholar. There is the matter of dates; Bryant's birth thirteen years before Longfellow may explain part of his ascendancy, but not the contrast between Longfellow and Whittier, who were born in the same year. That Hawthorne was considerably younger than Irving is significant, but cannot be taken as the entire reason for his neglect, since *The Scarlet Letter* and *The House of the Seven Gables* were published well within the period the record covers. Another important consideration, of course, is the adaptability of an author's work to illustration. Thus, however much Emerson's writings influenced the thinking of a painter, he would hardly be likely to depict a scene from *The American Scholar*.

But this review is no place to discuss the many opportunities offered by a statistical approach to the definition of taste, or to outline the many pitfalls inherent in that method. Suffice it to say that compendiums like the one under discussion facilitate the survey of American art as a whole, rather than in terms of individual canvasses.

This is only one of the many contributions made by the *Exhibition Record*. No scholar dealing with any branch of American art that existed during the dates included will be able to move without consulting its pages. Indeed, this book is so useful that we may well wonder why it was not published years before. A similar codification for the Royal Academy in London was brought out a generation ago, in 1906–7, and these eight volumes covered not a limited period of time, but all of the one hundred and thirty-five years that the Royal Academy had flourished. Furthermore, other important English exhibitions have been similarly dealt with, while we Americans have still to wait for a comprehensive reference book covering the remaining eighty years of the National Academy, or such a major organization as the Pennsylvania Academy of Fine Arts.

During the last decade we have even seen grow up among writers on American art a school which makes of ignorance a virtue. That fine pictures are often discovered which scholarship is unable to attribute to any known artist has been taken to mean that the canvasses were strokes of genius created by workers without formal training. The anonymity of the pictures is due, of course, to nothing but lack of such studies as the one under discussion. Yet it is used as an argument to show that the pictures are "folk art" or "primitive" or whatever similar phrase catches the fancy of the theorizer. There were, of course, untrained painters in America, and some of them were quite skillful; the

9. *Documentos de arte argentino*, Buenos Aires, Academia Nacional de Bellas Artes, 1939 +.

10. Cf. *Documentos*, IV, pl. XIV with Kubler, *op. cit.*, 1940, pls. 57 and 21; with Hewett and Fisher, pp. 105 and 193.

point is that our ignorance makes it difficult for us to separate them from whole schools of professionals whose ideals, technique, names, and achievements are lost to scholarship. Thus from the outset many canvasses are misunderstood. Unreal virtues are seen in them and real virtues are ignored or distorted. A hubbub is raised that delights a few enthusiasts, but disillusions many critics concerning the contributions of American art.

That so obvious a tool as a compendium of the National Academy catalogues has waited so long for publication reveals again that our intellectuals have looked upon our native traditions with a jaundiced eye. Steeped in European culture, they are predisposed to ignore such aesthetic achievements as America boasts. The chauvinists who make ridiculous claims only encourage the critics in their prejudices; sound scholarship is needed to bring facts to the attention of those who are susceptible to facts. For even writers on American history assume that we know little about American art because "there is little to know." Actually museum walls (and museum cellars) are crowded with pictures, an intelligent appraisal of which would tell us fascinating things about our culture. Many of these works and the men who painted them were unknown until recently. Twenty years ago even the best informed critics were ignorant of such men as Edward Hicks (1780–1849), George Caleb Bingham (1811–79), and John Quidor (1801–81) to name only three. In the winter of 1943–44, another important artist was exhumed: Martin Johnson Heade (active 1843–72). Who can guess what rich works still remain to be discovered?

In this labor of exploration connoisseurship, although important, is not enough. Scholarship is also needed. Individual canvasses must be grouped before they can be completely understood. And toward this end catalogues like the one reviewed in this article are basic.

Miss Bartlett Cowdry, the compiler of the *National Academy Exhibition Record*, is to be congratulated on an excellent piece of work, as is the New-York Historical Society for its vision in initiating and sponsoring the publication. The volumes are an encouraging symptom of the change that is taking place in scholarship in American art. The little band of devoted workers who have for many years been trying to bring light out of darkness is being swelled by new recruits. The problems raised by our native aesthetic activity are increasingly catching the imaginations of serious scholars, workers of ability, who like the pioneers of old prefer hewing clearings in virgin territory to ploughing again the long-cultivated fields of European art. True, the universities lag behind in this movement; most of the activity is being carried on outside academic walls by historical societies, museums, and private individuals. Not until the great centers of learning bend their ability and resources to this promising new direction of research will progress be as quick as it should be. But there are signs that the university art departments are beginning to see the possibilities in the study of American art, and in the meanwhile an ever-increasing band of lay workers like Miss Cowdry is erecting the foundations on which a new structure of knowledge will eventually be built.

JAMES THOMAS FLEXNER
Clintonville, Conn.

The Arab Heritage, Princeton University Press, 1944. Pp. x + 279; 18 ill. $3.00.

This book presents a series of lectures delivered at the Summer Seminar in Arabic and Islamic Studies held at Princeton University in 1941. The title is unfortunate, because in the book the lecturers quite rightly stress the fact that Arab thought and culture is a living, not a dead contribution to the world today. Since each of the nine contributors obviously tried to present a complete case in his lecture, duplication of subject matter was unavoidable. This is always the weak point of such a compendium.

"The so-called Dark Ages held no blackout for the Arabic-speaking peoples and Moslem lands." With this first sentence of his chapter "America and the Arab Heritage," Philip K. Hitti sets the tone of the entire book. He gives an extremely brief survey of the many phases of our cultural indebtedness to the Arab East, touching on too many subjects to do justice to any one of them. Yet the chapter makes pleasant reading; his exposé of Arabic studies in Europe and America is almost charitable. He tells how in Europe these were sidetracked by Semitic scholars who diverged from Hebrew into Assyriology and Egyptology, instead of realizing the value of Arabic for the understanding of the Old Testament. But why does Mr. Hitti object to the pursuit of Arabic studies as part of the equipment for foreign service, rather than for their own sake? Why not welcome any approach that may eventually lead to a wider spread interest in matters Arabic? Of course, it is shocking to realize that the *Cambridge Medieval History* allots only fifty pages out of over five thousand to the entire story of the Arab civilization in Spain, but then the present compendium is also singularly reticent on the subject of Saracenic history. In America also, oriental studies ignored Arabic until a few years ago. One reason for this Mr. Hitti sees in "an inflated sense of racial superiority and intellectual complacency" catered to "by ignorant statements of the press, clerical interests and missionary reports" (p. 13). For the lack of interest in the average student Mr. Hitti finds several pertinent excuses. Proceeding to the present day need of control of oriental languages and knowledge of the cultures they represent, Mr. Hitti offers helpful suggestions which combine academic training with practical fieldwork. Not only the cultures of the past, but also the contemporary world of Islam offers a fertile field of investigation. The author's hopeful enthusiasm is infectious and we can only hope that a collaboration of the American Council of Learned Societies and the various scientific foundations may lead to the award of scholarships.

In his chapter "Pre-Islamic Arabia" Giorgio Levi della Vida points the way toward such sponsored archaeological research, especially in South Arabia, long ago "an important center of economic life, of political power and of high culture" (p. 35). His contribution is commendable; the complicated forms of pre-Islamic worship are clearly explained, from the animistic belief in the jinn to the syncretistic Meccan ritual. For the reader interested in the civilizing and deteriorating influences which ranged and changed from the south to the north, from life in cities to nomadic barbarism, I warmly recommend the study of Nelson Glueck's *The Other Side of Jordan*, New Haven, 1940.

To Julian Obermann in his "Study in Background and Foundation of Islamic Origins," which covers to some extent the same ground, "the germinating forces of the two older religions are apparent in every phase and mode of the manifestation of the new religion" (p. 59), and he sees in Islam merely a repercussion from Judaism and Christianity. At an early time vigorous Jewish missions had settled in Yemen and the Hejaz. Christianity entered in the form of Nestorianism and Monophysitism, while the Quraish, the Prophet's own clan, leaned toward Mandaean gnosticism. Thus Muhammad found the people well stirred up, ready to receive his message, the Koran, the first known literary product of the Arabic tongue. Mr. Obermann attempts to elucidate the difference between the early, oracle-like Surahs and those written later with an impressive array of quotations, and comparison with formulas from the psalms and Gospels. The study lacks clarity; the many divisions and subdivisions are hampering rather than helpful, and mostly superfluous.

One more chapter deals with the pre-Islamic background: "Growth and Structure of Arabic Poetry" by Gustave E. von Grunebaum. I fear that the clumsy writing, unnecessarily inter-

spersed with German technical terms, e.g., "Kunstdichtung, Hochsprache," will hinder rather than help receptivity of this subject, remote in any case. That Muhammad "was careful in drawing a line between himself and the poets" (p. 127) seems natural because he lacked feeling for any of the arts. Yet many parts of the Koran are written in *saj*, rhymed, rhythmical prose. *Saj*, possibly the most original Arabic contribution to literature, is entirely left out by Mr. Grunebaum. He does not even mention the *Maqamat* of al-Hariri, that most delectable forerunner of the picaresque novel, that incredible jugglery of rhetoric skill interspersed with elaborately precious verse.

I have mentioned before the lack of appreciation of the Spanish-Arabic civilization in the *Arab Heritage*. It might have been more to the point if Nabih Amin Faris, the editor of the present volume, had chosen to present the life and teaching of a true Arab, such as Ibn Rushd, Averroes, who died in Morocco in A.D. 1198, rather than that of al-Ghazzali, a Persian trained in a Turkish school. But this is merely a personal reaction; other readers will be grateful for the clear, unbiased portrait of a noble and wise man.

"The Course of Arab Scientific Thought" by Edward J. Jurji would have been improved had the author confined his chapter to one phase of the scientific movement which extended "from the confines of China to the shores of the Mediterranean, and from the Atlantic Ocean to the Indian" (p. 221). The fine description of Sultan Qalawun's hospital at Cairo (p. 242) makes me wish that medicine had been chosen, to the exclusion of mathematics and astronomy. As the chapter stands now, it is largely a list of places and illustrious names. Incidentally there would have been space for including in the bibliography Lynn Thorndyke's *History of Magic and Experimental Science during the First Thirteen Centuries of Our Era*, New York, 1929.

The contributions of John L. La Monte and Henry L. Savage can hardly be praised sufficiently. "Crusade and Jihad" gives, in less than forty pages, the best account known to me of these famous wars. La Monte begins with a clear-cut exposition of war aims in all times, the political and economical versus the ideological which is emphasized by the historians of both sides, in order to secure popular support. "No issue is more calculated to stir up ordinary citizens than that of religion" (p. 159). The intricate chess game of Syrian politics which led to mutual tolerance has never been explained more simply and convincingly. This chapter deserves to be included in every textbook of mediaeval history.

"Fourteenth Century Jerusalem and Cairo through Western Eyes" by Henry L. Savage is the delightful account of the journey of one of the many pilgrims who went on the *saint voyage*. The travel diary of Ogier, baron of Anglure in the royal province of Champagne, will make profitable reading for any student of mediaeval life, but I feel that it should be combined with the *Peregrinatio Sylviae*, written a thousand years earlier. The noble lady saw the Holy Sites in all their Byzantine splendor and wrote inspired descriptions of the ceremonies she attended. Sir Ogier saw them under the supervision of Moslem officials and his description has archaeological value. But he saw also many other things, good and bad, all the little side shows of the theater of the world. Sir Ogier's party extended their visit to Mount Sinai and several Coptic monasteries and finally returned by way of Alexandria and Venice. I think that of all the tales he brought back to his family and friends, they must have relished most his visit to the Sultan's menagerie at Cairo, of the elephant with ears "large as a small windmill vane" (p. 211), and the "very strange and outlandish beasts which are called 'giraffa' " (p. 212). His excellent description antedates that of Clavijo by a few years. Pilgrimage remained a close link between the Catholics of western Europe and the various races and creeds which they encountered in the Holy Land. Yet by the end of the Middle Ages the *saint voyage* shows many features of the grand tour that was obligatory for a young Englishman in the eighteenth century.

The art historian is naturally most interested in the Arab contribution to art. But is this so negligible that Richard Ettinghausen could not concentrate his chapter, "The Character of Islamic Art," on that of the Arabs? Their one positive contribution, calligraphy, based on the various styles of Arabic writing, he explains lengthily as due to the unique position of the Koran, and demonstrates its use in architecture and ceramics. But he omits weaving where the use of script became the inspiration for the wide variety of patterns arranged in horizontal bands, where geometric and floral designs alternate and mingle with the written characters. These bands could in turn be twisted into endless polygonal patterns, *laceria*, or serve as framework for pictorial compositions. These elaborate frames might have been mentioned as another instance of the counteracting tendency toward dissolving form, for which Ettinghausen adduces the decoration of bronze vessels. This may "distract the onlooker" (p. 260), but surely even more it provides him with additional pleasure. The endless pattern is not an Islamic invention, but its application in interlacings and the seemingly aimless sprawlings of the arabesque imbued it with a new life.

Ettinghausen arouses our sympathy for the early craftsmen, "women, slaves, foreigners and Jews" (p. 252); we are glad to hear that in the second century of the Hijrah, although they were still mercilessly overworked and underpaid, they were told that "When a pious man fears God in the right way, it does not matter, even if he should be a weaver" (p. 258).

He has much to say about "luxury substitutes." The stern statement of the *hadith* that "he who drinks from silver and gold vessels, drinks the fire of hell" caused the substitution of earthenware for the noble vessels used by the Byzantines and Sassanians. Yet, I think, a purely economical cause might also be adduced; gold and silver have always been the sinews of war, and the demand for bronze and steel for the making of arms must have been tremendous. But "luxury is too human to be suppressed" (p. 255) and so a make-believe art was evolved, which used "disembodied" gold as a luster film over the potter's glaze. Ettinghausen's thesis that the Arab craftsmen "disembodied" living figures, human or animal, by rendering them like jointed puppets to be used in shadow-plays, is interesting; the elephants of the St. Josse silk fabric are a good illustration. But to sustain this thesis, he omits even mentioning the remarkable illustrations of the *Materia medica* by Dioscorides of A.D. 1222–23, several of which can be seen at the Metropolitan Museum and the Morgan Library, and the enchanting drawings of several manuscripts of the Maqamat by al-Hariri, all written between A.D. 1180 and 1250. Camouflage of the animal form into floral ornament and arabesque leads to the evolution of an abstract design of true surrealism.

Ettinghausen believes that "another far-reaching effect on the development of Islamic art was the human aspect of Muhammad's activities" (p. 256), which precluded the evolution of an iconography comparable to the Christian. But Buddhism, though comparable to Islam in disclaiming supernatural powers for its prophet, very soon evolved an elaborate iconography.

Architecture is barely mentioned, yet the faith of Islam produced the mosque which in Arab lands retained the features of the prototype, the Prophet's house at Madinah. Ettinghausen might have given a description and illustration of the mosque of Kairwan, built in the ninth century.

Of the eighteen illustrations only one represents an object in an American museum, and a second shows an object owned privately in New York. The equivalent of at least half of the illustrations would have been available within easy reach of the student, in many of our collections. The bibliographical list is more impressive than helpful. The best guide to Islamic art in the English language is not even mentioned. This is *A Handbook of Muhammadan Art* by M. S. Dimand, 2nd ed., revised

and enlarged, The Metropolitan Museum of Art, New York, 1944. The text is clear and straightforward; the chapter dealing with "The Origins of Islamic Art" will be interesting to the layman and the general art student as well as to the specialist. More than two hundred illustrations give a well-rounded picture of the Metropolitan Museum's magnificent collections.

In summing up we find that, although *The Arab Heritage* makes valuable contributions toward the understanding of certain phases of Islamic thought, only two of the nine contributions are of the first order. The general reader will find Philip K. Hitti's standard work, *A History of the Arabs*, 2nd ed., London, 1940, or the same author's abbreviated book, *The Arabs*, Princeton University Press, 1943, more profitable and pleasing. Or if he wishes for an anthology, there is *The Legacy of Islam*, Oxford, 1931. This last named compilation of papers by individual scholars was obviously the lodestar of the editors of *The Arab Heritage*. But the scope of *The Legacy of Islam* is confined to the achievements of the past and their influence on the culture of Europe. Thus it is more homogeneous and altogether the better book.

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LIST OF BOOKS RECEIVED

Augustus John, introduction by John Rothenstein, New York, Oxford University Press, 1944. Pp. 26; 95 pls., of which 4 in color; frontispiece; 13 text figs. $5.50.

PAUL BROMBERG, *Architecture in the Netherlands*, New York, The Netherlands Information Bureau, 1944. Pp. 94; 117 ill. $1.00.

ALLAN ROHAN CRITE, *Were You There When They Crucified My Lord?*, Cambridge, Harvard University Press, 1944. Pp. 93; 39 pen and ink drawings. $3.00.

The Detroit Institute of Arts, *Catalogue of Paintings*. Pp. 188; 34 ill. *Paintings and Sculpture Illustrated, a Companion to the Catalogue*. Pp. 212; ill. *Twentieth Century Painting*. Pp. 58; ill. *Italian Gothic Painting*, by W. R. Valentiner. Pp. 55; ill. Detroit, 1944.

JOSEPH VAN DER ELST, *The Last Flowering of the Middle Ages*, New York, Doubleday Doran, 1944. Pp. 127; 107 pls., of which 16 in color. $7.50.

DARRELL GARWOOD, *Artist in Iowa, the Life of Grant Wood*, New York, W. W. Norton and Company, 1944. Pp. 259; 10 pls. $3.50.

Henry Moore — Drawings and Sculpture, with an introduction by Herbert Read, New York, Curt Valentin, 1944. Pp. 44; 346 ill.; 14 color plates. $17.50.

ADA MARSHALL JOHNSON, *Hispanic Silverwork*, New York, The Hispanic Society of America, 1944. Pp. 308; 265 ill. $4.00.

JAMES G. MANN, *The Etched Decorations of Armour, a Study in Classification*, Annual Lecture on Aspects of Art, British Academy, Oxford, The University Press, 1944. Pp. 31; 35 ill. $3.00.

ELIZABETH MCCAUSLAND, *Picasso*, New York, The A.C.A. Gallery, 1944. Pp. 30; 13 ill. $.50.

Notes Hispanic, New York, The Hispanic Society of America, 1944. Pp. 133; 92 ill. $1.00.

VICTOR PERARD, *Hands and Their Construction*, New York, The Pitman Publishing Company, 1944. Not paged; ill. $3.50.

EDGAR P. RICHARDSON, *American Romantic Painting*, New York, E. Weyhe, 1944. Pp. 50; 236 ill. $10.00.

BERNARD SMITH, *Moses Soyer*, New York, The A.C.A. Gallery, 1944. Pp. 60; 43 ill. $1.50.

LETTERS TO THE EDITOR

SIR:

The article in your December 1944 BULLETIN in which Mrs. E. Tietze-Conrat discusses the authorship of Titian's *Venus with the Lute Player* leaves the reader feeling as though he had been caught in a saturation bombing raid. Emerging miraculously alive after the storm has passed he cannot help wondering just what has happened and what it was all about. Indeed, when such a reputed and well equipped scholar attacks one of the most valued possessions of an important museum by assigning it to a painter unknown to most of us — that is what might be called news. At least one prominent scholar in the field of art history is reported to have found the article entirely convincing, and thus it seems to me that an analysis of the author's arguments is decidedly in order. In favor of the article this may be said, that in its general method it could serve as a model for budding art historians who wish passionately to prove a point. But the analysis of the advantageous aspects of the author's method and their practical application I leave to others. Against the article on the other hand, I find its use of elements of the blitzkrieg, which I maintain to be in contravention of the accepted rules of warfare with the not unprecedented result that the goal is after all not achieved.

In the last paragraph of her article Mrs. Tietze expresses pardonable pride in her own courage in thus demoting the Holkham *Venus* from a work by Titian to one by Domenico Tintoretto, a son of the great Tintoretto's middle age. None of the other connoisseurs, she asserts, would have dared to claim the picture for the less known artist. But, she adds, "this need not discourage us." I am indeed aware that several qualified writers on Italian painting have claimed the painting for Titian, among them Hadeln, G. M. Richter, Berenson, Suida, Hans Tietze (Titian with helpers), and Lionello Venturi. But I cannot join in attributing their opinions to timidity.

Aside, however, from the question whether or not accredited critics have accepted the work as by Titian, I am anxious to discuss in detail some of the arguments put forward, not only because I think the conclusions do a blind injustice to a great and noble painting, but also because I wish to protest against certain methods of procedure which I believe could be dangerous to the integrity and reputation of art history if carried too far.

Mrs. Tietze fires her one big gun in opening the bombardment. It is the quotation from Sandrart's catalogue of his own collection of paintings in which he lists as "by Jacopo Tintoretto the Younger a Venus recumbent on a velvet couch, entirely naked, on whose head Cupid puts a wreath of laurel while a courtier attends playing the lute, life size." Mrs. Tietze claims that this composition is to be indisputably identified with ours. She presumes that Sandrart was a frequent guest in the house of Tintoretto and that "there is not the slightest reason for questioning the attribution to Jacopo Tintoretto the Younger, whom we may with certainty identify with Domenico. . . ." But we are not told why Sandrart, the frequent guest, remains in ignorance of Domenico's Christian name. Another minor yet impeding difficulty is the matter of the wreath, or wreaths, with which Venus is crowned. Sandrart must at least have known his own picture and must also have known laurel when he saw it. The European *Laurus nobilis*, one of the most famous trees since ancient times, has rather large lanceolate leaves and very small axillary yellowish white flowers. On the contrary, the wreath in Titian's painting (and in the copies from it) is composed of small leaves with rather large pink flowers. This discrepancy though minor may well cause us to hesitate about accepting the identification of the Sandrart composition with ours. Otherwise we might have supposed the painting owned by Sandrart to be identical with a lost seventeenth century copy of Titian's *Venus with the Lute Player* which is recorded in a photograph belonging to the Metropolitan Museum.

Near the beginning of the article and again near the close a device is employed which seems to me little calculated to clarify or dignify art historical procedure. I refer to the introduction into a supposedly informed and closely reasoned study, of testimony taken from a friend of the author, an artist from Europe whom the reader has not the advantage of knowing but whose sensitive intuitions are utilized to impose a mystical, ex cathedra sort of authority. We are told, for instance, "The rendering of the flesh did not seem to him to be Titian's. It did not grow from the interior."

The effect of the intuitional, oracular point of view upon Mrs. Tietze's own reasoning is evident throughout the article, and is the method in much of the argument which thus becomes far too vague and personal to permit the reader's following satisfactorily. He is told arbitrarily that there is no cushion at Venus' back and that her weight therefore must rest on her elbow and that her shoulder ought therefore to be forced upward. Actually the position of Venus herself and also of the putto behind her tell us all we need to know about that cushion. It is unquestionably there. At this point in the argument Mrs. Tietze apparently recognizes that she has misunderstood the reposeful style of Titian. She therefore swings to the opposite position, complaining first that our Venus does not relax, and immediately afterward that her upper arm and elbow should express more tension in order to sustain the weight of her body — the supporting cushion meanwhile having been removed as it were by the author herself. Next we are told, surprisingly enough, that the hand which terminates the supporting arm (which in the meantime needs to be more energetic) must by all means swing freely, and can by no means be permitted to hold a flute as in our picture! Furthermore we are told of mysterious "un-Titianlike thrusts into depth" which I am utterly at a loss to discover in the composition, and of the failure of our artist to "distribute the elements of his composition parallel to the frame," whereas he has in fact done so. Mrs. Tietze finds the body of our Venus impossibly heavy for the period of Titian's activity, the early 1560's, to which most students have assigned her — this despite the glorious fat thighs which we all have seen displayed by the Gardner *Europa*, a documented work of that time. But these discussions could continue indefinitely, for Mrs. Tietze is a scholar of infinite resource and most of the points she makes in this article seem to me to be debatable, to say the least.

Two matters concerning methodology I do still wish to mention, however, because I think the time is ripe now for many writers on art history to ponder their proper use as against the temptation to abuse them. One concerns a more scrupulous employment of small photographic details to demonstrate similarities or contrasts in the qualities of paintings, as distinguished from their compositional motives. It is a method used not infrequently by art historians, notably by Emil Renders in his influential monographs on Flemish art, and can be dangerously deceptive to an acquiescent reader because the unspecific quality of such reproductions allows him to interpret them in any way the author urges. In the case of the Chicago *Venus and Mars* and the Venice *Adam and Eve*, details of which are reproduced in the article, I am fortunately familiar with the originals and

realize how little of their quality is actually to be found in the Metropolitan Museum's *Venus with the Lute Player*.

My second plea concerning methodology has to do with citations from the writings of other authors. In this respect I find some deplorable distortions in the article under discussion. The denial of the Holkham *Venus* to Titian required the demonstration that the "very invention" of the picture would have been impossible for that artist. A statement to this effect Mrs. Tietze claims to have found in the writings of Baron von Hadeln. She accepts the importance of his opinions and gives rather copious quotations from his published remarks and refers to him repeatedly. But at each reference the meaning comes closer to what the argument requires. If Hadeln says a Titian is unique in some respect that is enough. It means that the work is probably not by Titian at all. Thus on page 268 of the article appears this sentence: "Hadeln was quite right in placing the initial conception of the painting — if by Titian — in the 1540's." The introduction here of the phrase "if by Titian" seems to me indefensible in view of Hadeln's published remarks, which include the following passage from his discussion of our *Venus:* "Unquestionably the nude of the Venus of Holkham is the most magnificent memorial and tribute to Rome in all Titian's work; even more to ancient Rome than to the Rome of Paul III and Michelangelo." He praises her with "her head proudly raised and turned to the side in meditation" and finds the "ideal synthesis here attained of the sculpturesque with the magic and beauty of Venetian color. . . ."

That this feeling about the Holkham *Venus* will eventually prevail I personally have no doubt whatever. Violent challenges are apt to greet important museum accessions, especially in cases where great sums of money are rumored to have been paid. But time moderates the heat of opposition, and where Titian's *Venus with the Lute Player* is concerned I venture to predict that future criticism will become increasingly favorable. In appraising the present sustained attack the reader would do well to remember that Dr. Hans Tietze and Mrs. E. Tietze-Conrat are in a sense the rediscoverers of Domenico Tintoretto and have recently attributed a large body of drawings to him. His undignified drawing of a nude, reproduced in this article, could scarcely be farther in spirit from the classic dignity and calm of our *Venus*. But the temptation is ever present for the art historian to denigrate the great in order to magnify some favorite mediocrity.

HARRY B. WEHLE
The Metropolitan Museum of Art

After reading this letter, Mrs. Tietze-Conrat replied as follows:

SIR:

As a woman I cannot express myself in the grim military terminology which Mr. Wehle chose to deal with my article. As a scholar I feel no necessity to discuss his letter at all. I leave it to the readers of my article and his letter to decide whether he has disproved any of my essential points and has offered any new decisive arguments. Even the two objections against Sandrart's testimony (concerning the laurel and Tintoretto's first name) can be bewildering only for very inexperienced beginners.

I only wish to say a few words about the two paragraphs in which Mr. Wehle makes an attempt to cast suspicion on my good faith:

(1) When I discussed the whole composition of the *Venus* in order to show its basic difference from Titian's corresponding productions I carefully referred to these universally known and easily accessible paintings by pointing out the plates in a widely known book of illustrations. When toward the end of my article I added a discussion of a few "particular details" I had to illustrate the details suitable for comparison since the paintings in question are much less known and the illustrations scattered in various books. There is nothing unfair in this method.

(2) I most emphatically protest against the wholly unjustified imputation of having in any way distorted or misrepresented Hadeln's article, the gist of which is and remains that the Holkham *Venus* is a unique exception within Titian's work. No unbiased reader can for a moment believe that in the sentence quoted by Mr. Wehle the inserted words, "— if by Titian —," clearly separated from the rest of the sentence by dashes on each side, can mean anything else than my commentary, since a few paragraphs earlier I summed up Hadeln's analysis rather fully and emphasized his whole-hearted approval of the attribution to Titian.

The numerous museum directors, curators, and other experts who by letters or word of mouth expressed their reaction to my article were almost unanimous in declaring that every one of them had long since doubted the attribution. I felt indeed somewhat ashamed for having gone to such lengths in proving something apparently self-evident. I was therefore glad to learn from Mr. Wehle's letter that at least one curator in this country had always been convinced of the authenticity of the painting. The vehemence of his letter, in contrast to the tone of my article, however, makes me wonder whether he is still convinced. When he now starts to study Domenico Tintoretto, an artist who, he admits, is "unknown to most of us" he will soon discover that the nude illustrated in my article forms part of that famous so-called sketchbook in the British Museum considered the peak of Jacopo Tintoretto's art until Hadeln, by no means we, recognized Domenico's hand in it. Now the sketch has become in Mr. Wehle's words an "undignified nude." I repeat my hope expressed in the article that the Holkham *Venus* will fare better and will continue to be admired even if it is not by Titian, but by Domenico Tintoretto.

E. TIETZE-CONRAT
New York City

SIR:

In his review of *History and Technique of Old Master Drawings, A Handbook*, published in the December 1944 issue of the ART BULLETIN, Mr. Henry Reitlinger defines as the aim of his criticism an "appraising . . . from the standpoint, not of what it [*scil.* my book] has accomplished, but of what it has failed to accomplish." Faithful to his aim, he has indeed avoided speaking of the real content, viz., the ideas and the problems expressed and discussed therein. The spiritual content of a book, according to the reviewer, is without any interest *per se*. "No amount of disquisition, however learned and however rich in theory, can be of the slightest interest to readers who cannot see the drawings in at least a passable representation." Consequently, he gives an enumeration of what in his opinion are my omissions. His list, however, is so inaccurate that I should like to take the opportunity to correct his errors.

The reviewer claims first that the fine series of reproductions which most of the great collections have published "from the early ones of the Albertina and the Uffizi to the present, should have been described by the author of such a work as this." However, he overlooked the fact that all the great facsimile publications are quoted in the notes, the catalogue and the section of bibliographical abbreviations.

He states that "it is important that the student should know that he must look in vain for authenticated drawings by Giotto and Masaccio." On page 24 of my book I say: "This statement remains an hypothesis since there are no extant drawings by the 'Fathers of the Renaissance': Masaccio, Brunelleschi, Donatello."

He says, furthermore, that "the scantiness of the material left us by Titian in the shape of authentic drawings is another

matter that should not be omitted." On page 48 Mr. Reitlinger could have read: "The Venetian classic Titian Vecellio (1477–1576) was so much a painter that he seems to have drawn relatively little (only about thirty-five drawings of his are preserved)."

The reviewer goes on to say that it should have been mentioned that "so great and prolific a painter as Velázquez has left no generally accepted drawings save some slight and almost negligible fragments." In the preface (p. v) I stated: "One may remember that drawing in this country [Spain] does not by any means play such an important role in the creative process as it does in Italy or France."

As to the selection of drawings Mr. Reitlinger declared that "The medieval examples might with advantage have been omitted altogether" and added that I included "a few examples at random." The relatively few examples from the Middle Ages were all carefully chosen to illustrate certain problems of draughtsmanship treated in the text.

According to the reviewer, "no textbook should omit Elsheimer." I agree wholeheartedly with this opinion and therefore I have included this artist; one of his beautiful drawings can be found under no. 191.

The reviewer also remarks that there is "no example of his [Ingres] portrait drawing." Under no. 246 is reproduced the beautiful portrait of Cherubini by this artist.

I can find no other explanation to these groundless and erroneous statements of Mr. Reitlinger than that he has not really read my book and that he even failed to look carefully at its illustrations.

As to the quality of the reproductions the reviewer's criticism is obviously directed against the publisher and the printer, rather than against the author. But in all fairness to the former I must say that the book was printed on the best paper available under the present circumstances and that the reproductions were made by the best printer for collotype in the country, viz., the Meriden Gravure Company. In fact, the standard of the illustrations is far above that of the average illustrated books of art in this country and has to my knowledge the best illustrations in a book on old drawings published in this country, with the exception of the great catalogues of the public collections, where obviously reproductions were made after originals. Of course equal quality could not be obtained in a book like this because of the widely scattered material published in it. Mr. Reitlinger, however, seems to be unable to discriminate between good and bad reproductions, as his few concrete remarks clearly show. According to him Rubens' drawings (nos. 182, 184) "suffered" much in the reproductions; whereas actually they are quite well done. On the other hand he does not mention less satisfactory reproductions such as the Ghirlandaio no. 52, a good photograph of which I was unable to procure, but which I wanted to include because it illustrates a problem treated in the text. The reviewer complains that "a few [reproductions] are nearly invisible," but he forgets that these drawings, like the Botticelli (no. 54) or the Jacopo Bellini (no. 114), are not any clearer in the originals. If I included them it is again because they illustrate interesting problems of draughtsmanship. He also critizes my choice of a Millet landscape declaring that I "could have furnished a better example of his style"; but if I had chosen a more typical Millet drawing, e.g., one of his toiling peasants, I would have completely destroyed the harmony of the last plate, which I devoted to the development of French landscape drawing of the second half of the nineteenth century.

The reviewer complains that I left out some masters like Goltzius, Chodowiecki, Menzel, etc. and that I omitted the English school; but I explained in the Preface why I had to do so.

Only in a single instance does Mr. Reitlinger make a critical remark concerning attributions. The beautiful drawing by Raphael (no. 83) in the Uffizi is according to him "a typical example of Pontormo and not by Raphael at all." This remark is all the more surprising since the drawing has nothing of the style of Pontormo but is typical of Raphael and is recognized by the greatest scholars as a study for the figure of Adam in the fresco of the *Disputa* (Fischel, *Raphael*, no. 293) and besides is lacking in the *Catalogue raisonné* of Pontormo's drawings by F. M. Clapp.

Mr. Reitlinger makes the complaint that the book is "difficult to read." This may be why he has merely skimmed through it, instead of reading it carefully, as I have tried to show above.

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